Rubber Journal and International Plastics

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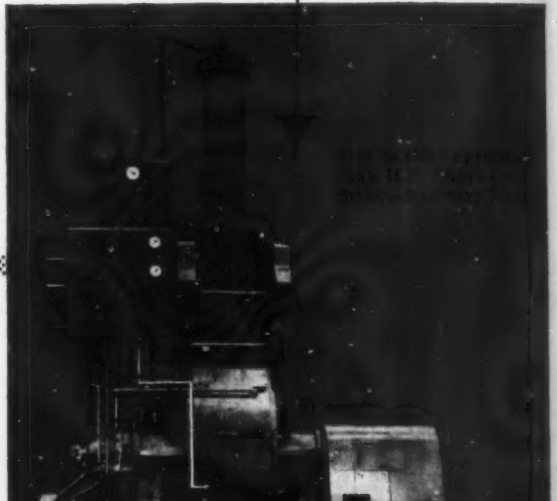

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Rubber Journal and International Plastics

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IN ITS 76th YEAR

November 7 1959

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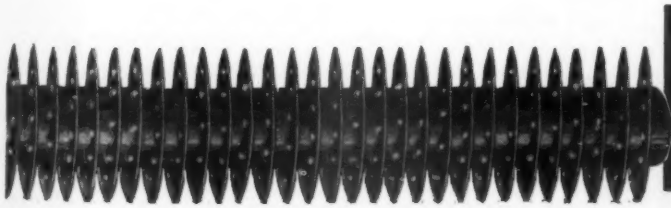

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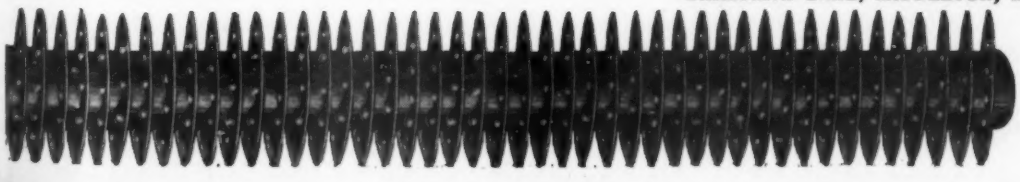

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NOTES of the WEEK

Planning for Natural

SOME of the decisions taken and plans made for coordinating natural rubber research and development in Malaya and other countries have recently been announced by Sir Geoffrey Clay, Controller of Research in Malaya. Notable is the decision to discontinue the rubber-in-roads research and publicity campaign in the USA. Of this Sir Geoffrey said that there was such a marked and lively interest in this field by US synthetic rubber manufacturers that he thought there was not much hope of natural finding a sufficiently large market. He quoted in this respect also the stable prices and steady supply of the synthetic product. In another context, he mentioned the International Synthetic Rubber Co. at Hythe, although not, according to reports, by name, and instanced the same emphasis on price and supply. There was, he said, a tremendous pressure on in many countries to switch from natural to synthetic rubbers. In the face of this it was essential to keep manufacturers in touch with natural developments, and he stressed that although a technical advisory service would replace the rubberized roads programme in the USA, trials and publicity campaigns would continue in countries where synthetic rubber had not such a firm hold. Regarding the importance and value of continuous operational research, Sir Geoffrey stated that he had discussed the matter with Imperial Chemical Industries, whose permanent work study project achieved savings of 8% against the 2-2½% for industry generally. It appears possible that I.C.I. experts will assist the Malaya Rubber Fund Board to set up a unit in Malaya to undertake a continuous survey of the problems of labour, efficiency and management. From this preliminary report it is clear that the problems facing natural rubber producers are fully realized and that a clear cut, active and definitive policy is to be pursued. Even though natural rubber may at present be riding fairly high and even though, with world demands increasing even faster than generally anticipated, the immediate future may look rosy enough, such planning for the industry is an absolute essential.

Raising Productivity

THAT there is considerable scope for raising productivity and lowering costs in smaller firms by the use of modern methods and techniques of management is amply demonstrated in a new booklet published by the British Productivity Council. Based largely on the work of The National Union of Manufacturers Advisory Service (NUMAS), the booklet describes what has been done in 12 typical small firms through techniques such as work study, costing, production control, office organization, and incentive schemes. One of the objects of the Conditional Aid programme was to help and encourage the wider dissemination of knowledge about modern practices and techniques of management, to draw the attention of industry to their potentialities and to help and encourage their adoption. The National Union of Manufacturers was enabled to institute an Industrial Advisory Service in 1953-4 with the aid of Conditional Aid grants, and this is now established as a self-supporting, non-profit-making organization. The present Report describes the development of NUMAS and examines some aspects of the problems confronting the smaller manufacturing firms which constitute its main field of activity. Now that the Conditional Aid Scheme has been wound up the British Productivity Council has undertaken to follow up some of the activities it promoted which have been established on a continuing basis. One method of follow-up has been the preparation of reports placing special emphasis on case examples, and this publication is the latest one in that series. The case histories are from firms ranging in size from 6 to 300 employees and from a wide range of industry including one company in the plastics industry.

Problem in Plastics

BASICALLY, the problem in the plastics manufacturing company, which employed 250 people, was a human one. When the Advisory Service was called in, turn-over was not high enough to recover all overheads, let alone give a reasonable return on the capital employed. The report states that although the management had given considerable thought to various procedures covering the putting of orders through the works and despatching and invoicing products to customers, there was much overlapping and duplication of effort, and the necessary degree of control was lacking. In the emergency, clear briefs were given to selected principal executives, and a wave of enthusiasm spread throughout the organization. Output rose rapidly by 20%, later by a further 15% with capacity still not exhausted. Another effective move was to set up a 'productivity barometer' to inform everybody in the firm about daily, weekly and cumulative achievement, compared with expectation. The BPC booklet, which includes also an article describing what an Advisory Service can do, can be had from 21, Tothill Street, London, S.W.1, price 2s. 6d.

NEWS *Briefs*

MALAYAN SHIPMENTS — HUNGARIAN PLASTICS
W. GERMAN MACHINERY FOR USSR — FRENCH
TYRE PLANT — UNION CARBIDE DEVELOPMENT

●**Malaya**—Malayan shipments of sheet and crepe rubber in September totalled 92,159 tons compared with 88,609 tons in August and 73,967 tons in September 1958. Of the total, the United Kingdom took 9,580, the United States 14,559, West Germany 6,903, Japan 4,972, Europe 15,395, Commonwealth countries 7,861, the Soviet Union 15,524, and China 9,375 tons. Shipments of latex and revertex in September totalled 11,619 tons compared with 11,505 in August and 8,453 in September 1958. The United Kingdom took 2,889, the United States 2,291, West Germany 1,099, Japan 1,898, Europe 2,350, and Commonwealth countries 766.

●**Dominican Republic**—In September a total of 76,000 rubber plants were distributed to Dominican Republic farmers by the Department of Agriculture. This brings the number planted this year in the eastern region of the Republic to 176,000. The Department is concentrating on the ten varieties which give the highest yield. Farmers are being given instruction on methods of using rubber trees in association with a second crop which requires shade, such as coffee.

●**Indonesia**—Indonesia is to export 20,000 tons of rubber to the Soviet Union in 1960 under a new trade agreement signed in Moscow recently, a Government spokesman said in Djakarta over the weekend. The contract for 1959 originally called for Indonesia to deliver 14,000 tons of No. 1 and No. 2 RSS to the Soviet Union this year but Antara recently reported that this had been extended by between 1,000 and 2,000 tons.

●**Western Germany** — The Union Carbide International Plastics Co. of the United States is to develop its position in the European market, Mr William A. Woodcock, vice-president of the company said in Düsseldorf last week. Speaking during the plastics exhibition Mr Woodcock said that Union Carbide's partner companies in Italy and Belgium would start the production of plastics 'in the near future' and that a laboratory for technical aid to the European plastics industries was under construction. Union Carbide International has a 50% share in a new Italian company, SPA Celene, of Milan. The other 50% is held by the Italian firm of Edison of Milan. This company is to start producing plastics from January 1 next, making 12,000 tons to 15,000 tons annually and increasing this to 30,000 tons by 1961. Main products are to be polythene and chemicals. In Belgium the company has a 50% share in Cobenam SA of Antwerp, whose other share is held by Petro Chim SA, also of Antwerp. It is planned to produce 15,000 tons of polythene annually there.

●**France**—The Firestone Tire and Rubber Co. will build a multi-million dollar plant in France, Mr Harvey S. Firestone, Jun., the company's chairman, announced in New York recently. The company also plans to build on the same site a plant for the manufacture of special synthetic latices and copolymers of butadiene and styrene, Mr Firestone said. The tyre plant will produce a full line of tyres and tubes for passenger cars, trucks, buses, farm equipment, motorcycles and scooters, Mr Firestone added.

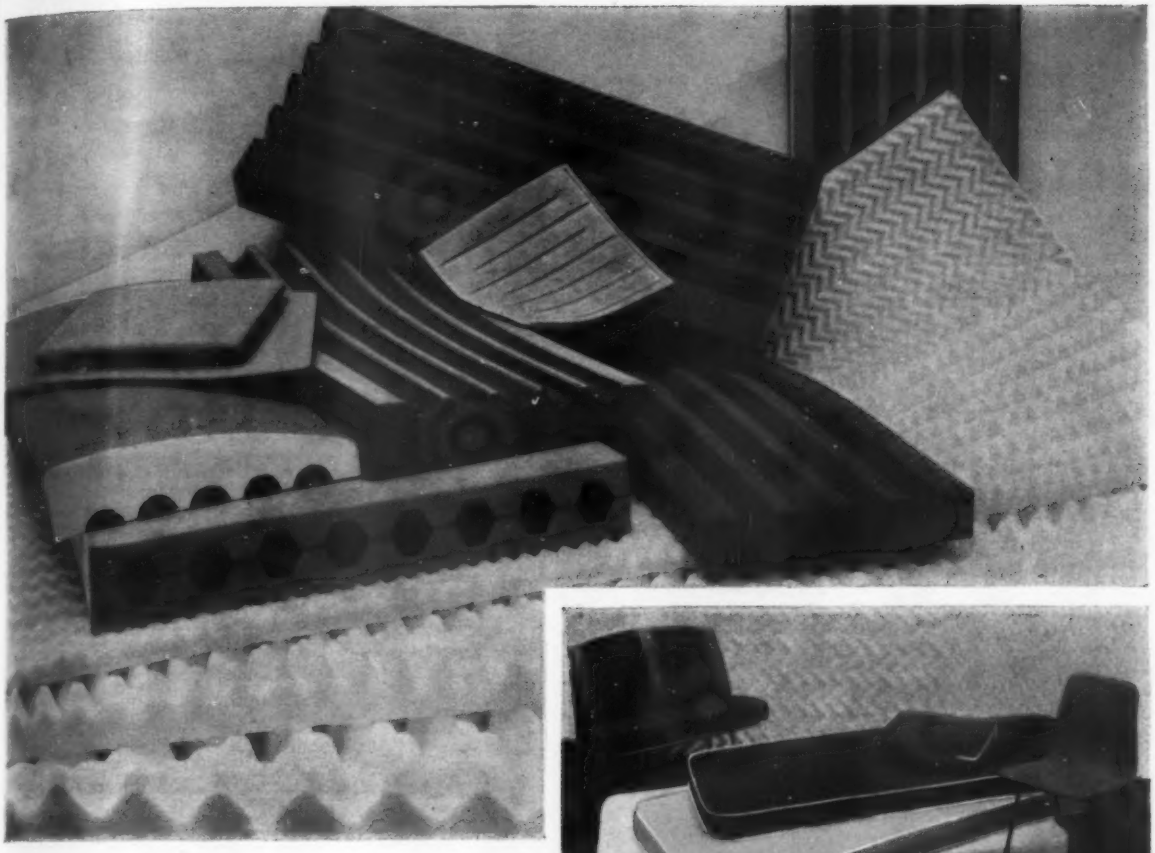
●**Hungary**—Proposals to step up the production of plastics in Hungary are made in a report just issued in Budapest outlining proposals for the country's second five-year plan (1961-1965). A polythene factory and a PVC factory each with an additional output of 10,000 tons should be built during the five years, says the report. And to increase the production of artificial fibres a 3,300-ton capacity plant should be built. A PVC plant which will have an annual output of 6,000 tons is already under construction.

●**Malaya**—The Malayan Cabinet has decided to send a delegation to the next meeting of the General Agreement on Tariffs and Trade, to be held in Tokyo this month. Malaya is one of a number of countries which does not recognize Japan as a GATT member.

●**West Germany**—The Soviet Union has placed orders for 150 million marks' worth of machinery for producing polythene plastics, Imhausen International of Bochum and Zurich has announced. The plants would be ready for production in about two years, according to Dr K. H. Imhausen, senior partner of the German firm.

●**Malaya**—A 22-man Japanese rubber trade delegation visited Singapore and Kuala Lumpur recently. Mr Kobayashi, manager of the Kasho Company, at Singapore, said the rubber industry in Japan was expanding and Japanese imports next year were expected to exceed this year.

'The Lord Chancellor told me himself — the Woolsack became so lumpy, he had it quietly stuffed with foam rubber!'—457



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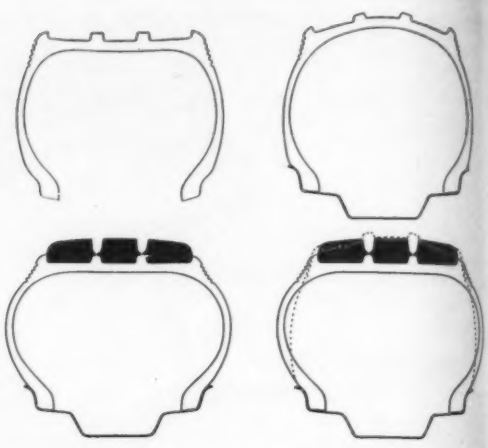
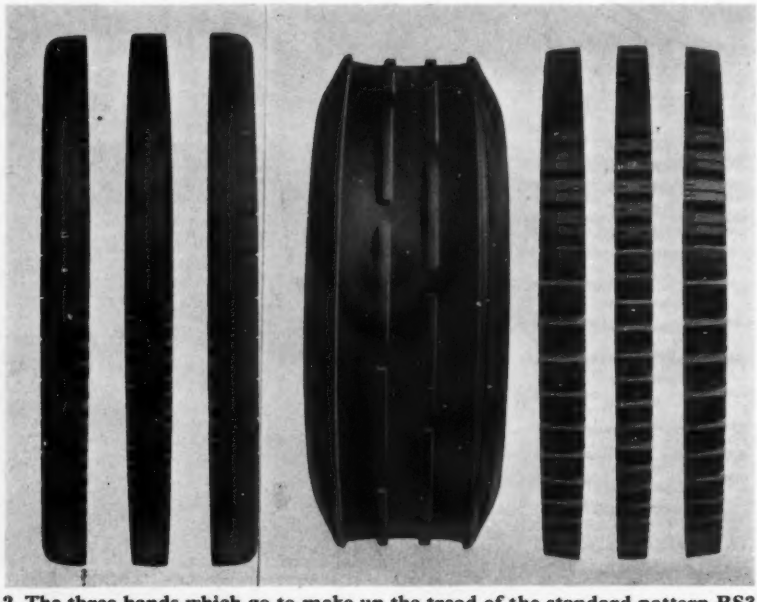
Pirelli Introduce New Tyre

SEPARATE AND REPLACEABLE TREAD



1. **An uninflated BS3 casing,** *top left.* **An inflated BS3 casing on a rim,** *top right.* **An inflated casing with tread bands on a rim,** *below left.* **An inflated casing with tread bands (solid line); inflated casing without bands (broken line),** *below right*



2. The three bands which go to make up the tread of the standard pattern BS3 tyre, *left.* **The three bands which make up the tread of the BS3 tyre, and the casing,** *right.* **These are winter pattern tread bands**

TYRES of which the tread is a separate and replaceable element were announced last week by Pirelli. The announcement was made simultaneously in this country, Italy, Argentina, Spain and Brazil, where the Pirelli group have tyre factories, and in other countries. The first production examples were shown in London on October 30 and presented for the first time to the public at the opening of the Turin Motor Show on October 31. The tyres, known as BS3, can be described as representing a step forward almost as significant as that marked by the introduction of the first pneumatic tyres.

The tyre was originally conceived by Mr Giuseppe Lugli, of Pirelli's technical study branch in Milan, and developed by Mr Carlo Barassi with the aid of a team of engineers. The project was co-ordinated by Mr Sergio Vittorelli, technical director of Pirelli in Italy. As a matter of interest, the ' BS ' in the name of the tyre stands for ' Battistrada Separato ' and the ' 3 ' for the three tread rings.

Outstanding features of the new tyres, result of many years' research and testing, are, in brief, as follows:

1. The tread is a separate and replaceable element.
2. Treads can be changed, without special tools or equipment, in a matter of minutes.
3. Special ice studs, or spikes, tungsten carbide tipped, can be fixed to permit motoring under full control at normal speeds on solid ice.
4. It is possible to replace bald treads with new ones at a fraction of the cost of a new tyre.
5. Treads can be changed without having to take the tyre off the wheel.
6. Treads will last as long as a complete tyre of normal construction and it is claimed that

3. The three principal engineers behind the BS3 project are, *left to right,* **Carlo Barassi, Sergio Vittorelli, technical director of Pirelli, Milan, and Giuseppe Lugli**

Electrical Aids in Industry *Data Sheet* **No. 8**

Light-Sensitive Cells

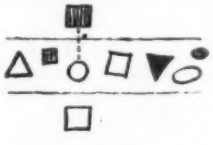
What are light-sensitive cells? They are devices which can sense and measure changes in the level of light or, in some cases, respond to the quality of light falling on them. There are various types of cell and each has its particular field of use. One of the best known is the photo-electric cell.

What can light-sensitive cells do? A change in the amount of light falling on the cell can cause a switch, relay or counter to operate. Alternatively, the direct indication of the light intensity can often allow some other factor to be determined and, if required, controlled. They are reliable and require little maintenance. Careful installation, as with all types of equipment, gives a good reward.

How can they be used? These cells have many applications in industry, for controlling processes, for inspection and measurement, for sorting material and for safety purposes:

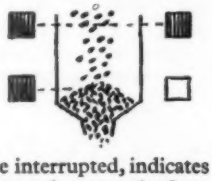
Counting

Where objects on a conveyor belt are too soft or light to operate a direct mechanical counting device, where they are too delicate or freshly painted to sustain physical contact or where the articles vary in size, a light-sensitive cell can be used. This counts the objects by interruption of an appropriately sited beam of light.



Hopper or Tank Level Control

Many forms of feed can be accurately controlled by light cells. One important one is for controlling the input to a hopper of fluid solids such as sand or peas. Here, two horizontal light beams are required: the upper, when interrupted, indicates that the hopper is full and stops the supply; the lower, when it ceases to be interrupted, indicates that the hopper is nearly empty and restarts the flow.



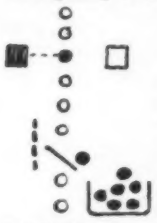
Package Content

The level of powder in packages can be checked with light cells. The cell is so positioned that when the

powder is up to the required level, the light reflected from the surface of the powder is picked up by the cell and causes the carton to be accepted. If not, it is rejected.

Colour Sorting

The quality of many articles can be gauged by their colour—seeds and nut kernels, for instance. The objects are fed into a tube by means of a vibrator pan and fall into the beams of three equally spaced light cells which scan them from all sides. If the object is acceptable it falls into a chute carrying it to one conveyor; if its colour is bad it is deflected as a reject.

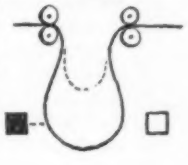


Guillotine Guard

Light cells for guarding a guillotine or power press should be used only as a supplement to a mechanical guard or where the latter is impracticable. The interruption of a curtain of light by a hand stops the machine instantaneously.

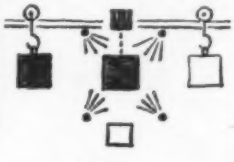
Press Feeding

Where the rate of feed of strip metal must be suited to a varying speed of acceptance by a press, a loop of the strip is allowed to sag between the feed and the press. When the loop reaches a predetermined depth a light beam is interrupted and the slack is taken up.



Processing Objects on the Move

Many articles are processed while on a conveyor line. For instance, where articles are to be sprayed while on the conveyor, the paint saved by stopping the gun between articles will make the device worthwhile. The same principle applies in a bakery to the spraying of baking tins with fat.



Automatic Door Opening and Closing

Doors can be caused to open or close by the interruption of a beam of light. This has its uses in such cases as control of doors on a heating oven or for the passage of vehicles in a factory. This is effected by a light beam on the side from which the approach is made (in many cases, both). When the approach beam is interrupted it opens the door which closes again after a given time interval.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association.

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the casing will outlast several treads.

7. The partially inflated casing is capable of travelling some distance without the tread bands.

Construction

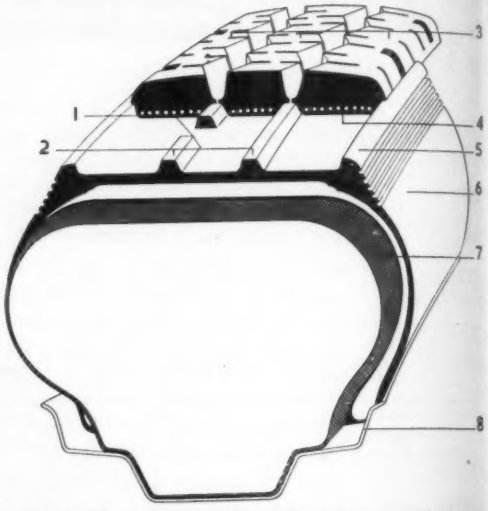
In a conventional tyre, the tread and sidewall are applied as a single extrusion to the carcase while the tyre is being built, and are bonded into the structure during the curing process. The Pirelli BS3 tyre consists of a casing or carcase on which are mounted three peripheral steel reinforced tread bands. Longitudinal rubber ridges round the crown of the casing exactly locate the bands parallel with each other across the crown of the casing. The bands are slightly smaller in diameter than the casing itself; thus when the casing is inflated, pressure is exerted all round the casing so that the bands cannot be displaced involuntarily.

Detail design of the casing, and the inextensible nature of the metallic reinforcement in the tread bands, ensure complete adhesion between casing and bands. The bands may, however, be removed without special tools or equipment when, for example, the tread pattern has worn smooth. The casing is deflated, and the tread bands eased off. In conventional good quality tyres the casing will outlast two treads and this is equally true of the BS3 casing. This means that after the first set of tread bands has been discarded, a new set may be fitted to keep the tyre in service.

In the unlikely event of a puncture the tread bands will not become detached until considerable deflation has occurred. Another point is that uneven wear of the tread or incorrect inflation need not result in premature failure of the tyre because the bands can be changed around laterally, or from wheel to wheel, to even-out wear. If necessary, only part of the tread, represented by a single tread band, can be replaced.

The three rings or bands which make up the tread are built and vulcanized under special processes. They are made principally of rubber, but incorporate in addition metallic cords laid longitudinally to form an inextensible belt. Pirelli stress that there is no possibility of the belt stretching or fracturing, or in any way failing to exert the pressure necessary to maintain complete adhesion to the casing. The safety factor is very high.

It is obvious that the new development makes possible the use of a wide variety of tread patterns and at the same time very greatly simplifies experimentation. For instance, new materials can be used either for tread —one, two or three bands—or carcase and these materials need not be pure rubbers. It is understood in this connexion that tests have already been made with, among other materials, polyurethane.



5. A cross-section showing the construction of the tyre: 1, ice pick seats; 2, locating ridges; 3, tread bands; 4, metallic cords; 5, shoulder of the tyre; 6, casing; 7, inner tube; 8, rim

4. This casing has travelled 400 miles at 60 mph, without the tread bands fitted

The announcement of the new tyre was made by Sir Gerard Clauson, vice-chairman, at a luncheon given by the directors of Pirelli Ltd. in London on October 30. Guests were received by Sir Gerard, Mr G. Baricalla, managing director, and Mr G. Venosta, director and general manager.

Main Requirements

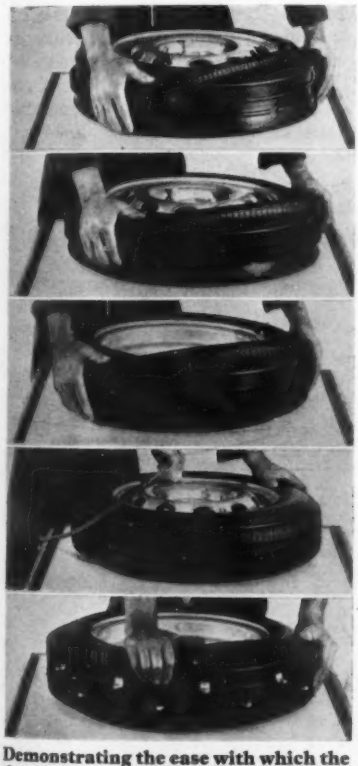
Outlining afterwards the development background and the advantages of the BS3 tyre, Mr W. M. Lewis, manager of the technical office at Pirelli's Burton-on-Trent factory, detailed six main requirements at which the company had aimed. These were, he said, the highest possible traction; comfort; silence; long life; ease of handling and safety from the point of view of punctures. The first five of these aims, said Mr Lewis, had been achieved with 100% success. As to the last point, they had devised a safety valve for the inner tube which guaranteed that, in the exceptional circumstances of a BS3 cover being penetrated, no blow-out would occur and the tyre would deflate gradually. Among other advantages, Mr Lewis added, was that at 85 mph, the BS3 absorbed 50% less horse power than that of a conventional cover which, for a standard

family saloon, represented a gain of some 16 bhp.

Tread Fitting

Fitting and removing the rings on the carcase are simple operations. With the carcase completely deflated, the central ring is slipped into position between the distancing ridges. The two side rings are then put on one at a time and the tyre inflated to the desired pressure. These operations take only a few minutes, and the deflation of the tyre and removal of the rings takes no longer.

The fitting of the ice studs is as simple. It is, of course, essential to use tread rings with the winter pattern in this case. After the central ring has been put on, the flat bases of the studs are slipped into the spaces designed for them in the breaks of the distancing ridges. One half of the base of the stud goes under the central tread ring, while the other half is covered by the side ring.



Demonstrating the ease with which the detachable tread bands of the Pirelli BS3 tyre can be put into place. The tyre carcase is deflated and then (*top*) the centre band is placed in position. Then comes an outer band and the wheel is turned over for positioning the other outer band. Top four pictures show the summer tread. Lower picture shows the winter tread and the simple method of fixing ice spikes into position if these are required

Pilot production of the BS3 tyre is to begin early next year at the company's Burton-on-Trent factory. Two sizes are at first to be made, suitable for, for instance, Rootes Group cars such as the Sunbeam, and for others such as the TR3, MGA, etc. Further sizes are to be introduced during the year. It was also stated that tests in Milan on giant tyres on the BS3 principle are well advanced.

RESEARCH COURSE AT NCRT

A short course of a rather more advanced nature than is usual at the College was run from September 21-25. Entitled 'Net-work formation in Vulcanization,' it was attended by nine research workers all of whom are currently engaged in characterizing cross-linked networks. Lecturers included the course organizers, Dr J. Glazer and Mr G. N. Welding, Dr C. G. Moore (BRPRA), Dr L. R. G. Treloar (British Rayon Research), Dr W. Watson (RABRM) and Mr B. Ellis (Cardiff College of Technology).

Practical work included measurement of dry and swollen modulus, strain (by the NBS strain tester), microhardness, sol-gel ratio and the use of swelling methods, a correlation between the methods being attempted by applying all of them to the same sheets of an ACS1 compound cured for a range of times at 140°C. The course was intensive including two evening lectures, the discussions which followed being at a high level and continuing well into the night.

The success of such a highly specialized course was gratifying despite the relatively poor attendance and it is hoped that other such courses may be organized to supplement the now popular basic short courses in aspects of rubber and/or plastics technology.

Glass Fibre Prices Up

Owens-Corning Fiberglass Corporation said in New York that it is increasing prices an average of 5% on some coarse glass fibre yarns used in reinforcing plastics and in coated woven fabrics, such as boat deck coverings. The company gave rising production costs as the reason for the action. Also raised in price by about 15% were several fine count yarns used in electrical laminates.

Mr L. Schepers, a managing director of the Royal Dutch/Shell group of companies, has been appointed chairman of Shell Chemical Company in succession to Mr F. A. C. Guépin who retired in June.

I.C.I. Add Isodecanol

Isodecanol has now been added to the sales range of carbonylation alcohols manufactured by the Heavy Organic Chemicals Division of I.C.I. on Tees-side. This is the first time that commercial quantities of Isodecanol have been made in Britain.

Isodecanol, a mixture of branched-chain primary alcohols esterified with phthalic anhydride to produce the plasticizer DIDP (di-isodecyl phthalate) gives enhanced properties to PVC products such as electrical cable and calendered film.

Amongst the important characteristics so far established for DIDP, such as good low-temperature and electrical properties and low density, its high permanence on thermal ageing is particularly notable. In a typical composition containing 33% by weight of plasticizer, I.C.I. record that the loss in weight of DIDP on heating for 24 hours at 100°C. was only 0.3% (DOP 0.5%) and, for 350 hours at 100°C., only 3.8% (DOP 17.4%).

Other carbonylation alcohols made by I.C.I. are iso-octanol, 'Alphanol' 79, nonanol, *n*-butanol and isobutyl alcohol.

Tyres to USA

The Englebert Stabi 6 tubeless tyre which is original equipment on Renault 4CV and Renault Dauphine cars is now being imported by United States Rubber Co. for distribution through US Royal dealer outlets.

The tyre is made in the Clairoix, France, plant of Société Française du Pneu Englebert, an affiliate of US Rubber. It is being imported in size 135 x 380 only, the metric equivalent of domestic size 5.00 x 15in., with and without a white sidewall, in rayon cord construction.

Macroplastic Exhibition

The second International Plastics Exhibition to be organized in Holland, 'Macroplastic,' will be held at Utrecht from October 19 to 26. The previous exhibition was held at Amsterdam in November 1957.

Mr G. Dodd, general manager of the plastics and technical products division has announced that Mr G. F. Carnell is appointed sales manager of polythene, effective immediately. Mr Carnell joined the company in 1957 to develop Monsanto's interest in the polythene market. With the Fawley plant now in production Mr Carnell will take over sales, reporting to Mr G. V. Cox, manager of the company's plastics sales department.

Kunststoffe 1959

REPORT ON DUSSELDORF PLASTICS EXHIBITION

FROM the short preliminary report in last week's issue of *RJIP* it can be seen that there was at Düsseldorf a very wide display covering the whole field of plastics including machinery, materials, semi-finished products and finished products of both technical and domestic type. In view of the wide range of products worthy of mention it is intended to report the Exhibition in separate parts each week until all the items of interest have been covered, rather than to give only brief reports of the various products on show. Also each report will cover various types of products rather than particularizing on machinery in one report, raw materials in another and finished products in another.

One of the first exhibits of interest on the machinery side was the new Henschel-Prodex 8in. extruder with a screw ratio of 24 to 1 which is well in excess of the normal extruder. As can be seen from Fig. 1 this machine is a very large construction. It incorporates a fume extraction vent for the removal of moisture and monomer. This can be seen halfway down the barrel. Due to this extraction vent, direct extrusion of profile can be carried out without pre-drying of the raw material. Output claimed from the machine is between 800 and 910Kg. per hour with a maximum screw speed of 55. The whole extruder is driven by a 160kW. motor. The machine is remotely controlled from the cabinet shown at the rear of the picture. Notable on this machine are the pressure gauges for giving readings before and after the main head and an interesting approach to the problem of reducing the build-up of burn at the head of the screw.

Fig. 1. The new Henschel-Prodex 8in. extruder with a screw ratio of 24 to 1. This machine incorporates a fume extraction vent for the removal of moisture and monomer; this can be seen half-way down the barrel

On the stand of Franz Baumann of Zurich, Switzerland, there was demonstrated an ingenious machine which makes bottles from thin polythene roll of varying thicknesses up to 1mm. In Fig. 2, the roll can clearly be seen feeding through the machine where the bottles are vacuum-formed into shape and heat welded round the edge, before being delivered ready for packing. The actual forming process is shown more clearly in Fig. 4 where can be seen one bottle which has just been released welded from the mould. The third illustration (Fig. 3) shows the whole machine including the silk screen printing equipment so that the bottles can be printed in the course of manufacture. The various intricate shapes that can be produced very cheaply from this machine are shown in Fig. 5.

Packaging

The obvious big application for this type of equipment will be particularly in the food and packaging industries where containers are used once for the commodity and then thrown away. The machine can apparently be adapted so that a third stage can be added where the commodity can be fed into the formed bottle and then the bottle sealed off so that the goods are ready for delivery intact to the customer.

Visiting the Hoechst exhibit it was

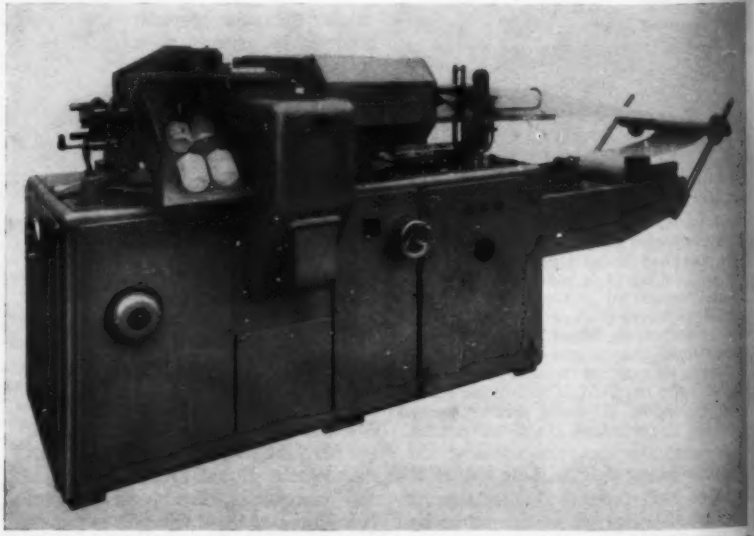


Fig. 2. An ingenious machine which makes bottles from thin polythene roll of varying thicknesses up to 1mm. was shown by Franz Baumann, Zurich

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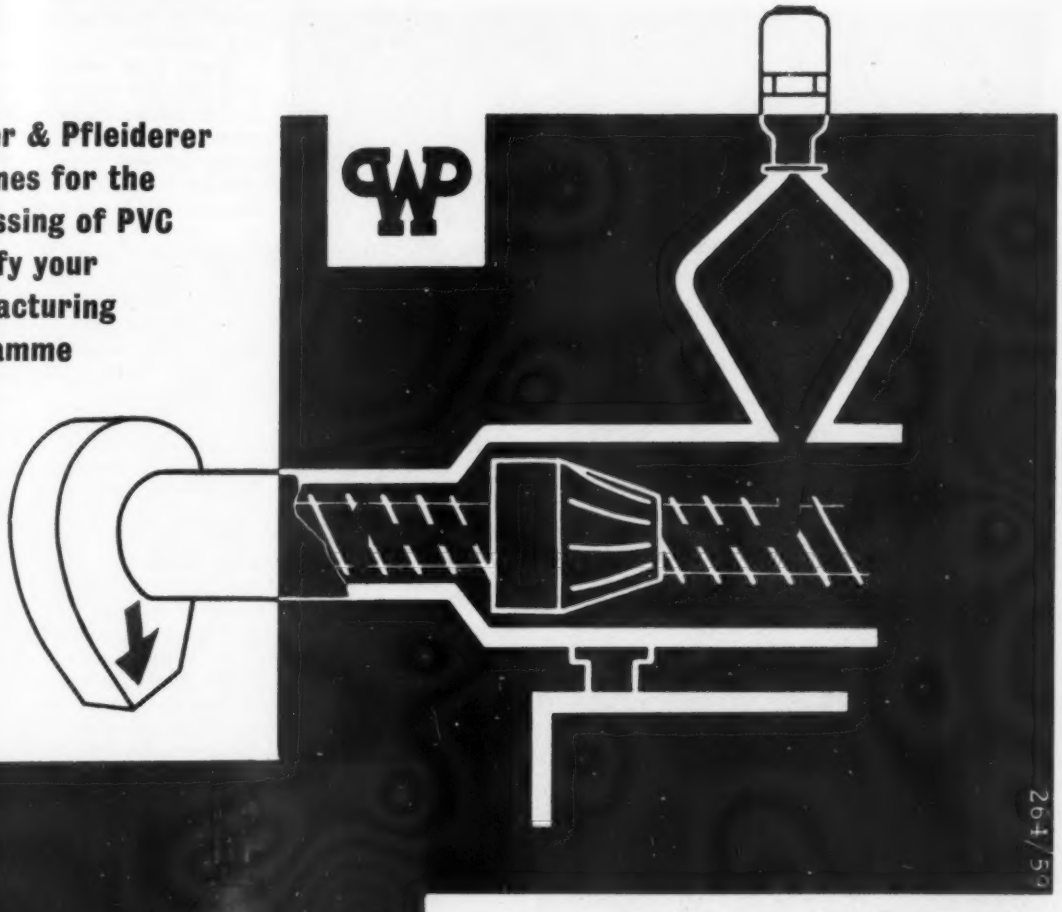

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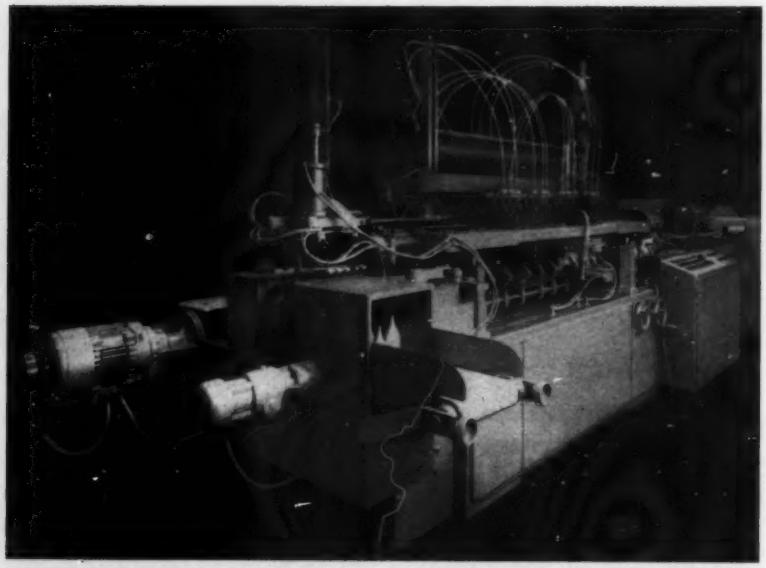

Fig. 3. This view of the whole Franz Baumann vacuum moulding machine shows the silk screen printing equipment incorporated so that bottles can be printed in the course of manufacture

Fig. 4. In this illustration bottles are being released welded from the mould of the Franz Baumann vacuum moulding machine

Fig. 5. Various intricate shapes can be produced very cheaply on the Franz Baumann vacuum moulding machine

most interesting to see a full working small scale laboratory plant producing Hostalen from the basic raw materials. This equipment was shown at the Brussels World Fair last year and illustrates the whole process quite clearly including polymerization, filtration, etc., right through to the end product. Also on this stand was a demonstration of the welding of high density polythene pipe by the use of special hot plates and although the process is to some degree known in England, the variety of different joints that can be produced may not be so generally known. This demonstration continuously attracted a great number of practical engineers as obviously the technique used will allow a considerable outlet for pipes, etc., in the chemical industry for installation for semi-skilled labour. There was also an example of a high density polythene scrubbing tower 24ft. high by approximately 4ft. 6in. wide (Fig. 6) which was a most interesting reminder of what is being produced by skilled labour from plastics materials.

There is an increasing demand today, with the continuously expanding use of plastics, for heavy duty internal mixers and therefore it was of particular interest to see on the stand of Werner and Pfleiderer their GK 50 machine which has a working capacity of 175lb. of PVC with an 18 to 19 second time cycle for each stroke. The illustration (Fig. 7) gives some idea of the size of this machine. It was designed in order to facilitate single shot loading procedure by elongating the neck in order to take the bulky premix. The rotors revolve at double speed and for plasticized compounds without filler the operating cycle is between two and four minutes, depending on the grade of material used. The machine, when processing polythene and polystyrene, serves both for fluxing or homogenizing and colouring. The time cycle here is between 2 to 6 minutes, according to the process of the operation, usually worked automatically. All controls for operating the mixer except the motor controls, are located on a control panel next to the feed hopper and within easy reach of the operator. Also on the Werner and Pfleiderer stand was an interesting new processing machine, the Plastificator PK 100/V (Fig. 8), with an extruding screw and barrel temperature control, designed for the continuous gelling and granulating of soft PVC. Developed in conjunction with Wacker GmbH, München, the

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Fig. 6. A high density polythene scrubbing tower 24ft. high by approximately 4ft. 6in. wide was incorporated in the Hoechst exhibit

be identical or different. Through this technique, of course, cooling time is totally eliminated resulting in a high production rate. Moulding costs are further decreased by use of an automatic sprue extractor device.

Of the two models, the P15, with an injection capacity of 15gm.

Continued on page 566

Fig. 7. The Werner and Pfleiderer GK 50 heavy duty internal mixer. This machine has a working capacity of 175 lb. of PVC with an 18 to 19 second time-cycle for each stroke

machine, in which gelling is effected entirely by frictional heat, has an output of soft PVC of 260 to 440lb./hr.

ER-WE-PA showed the granulation of polythene by the technique of extruding $\frac{3}{8}$in. solid rod from the extruder and whilst still hot stretching the rod over a series of pulleys in water till it is pulled down to $\frac{1}{4}$in. ready for granulation at the end of the machine, by which time the material is also sufficiently cold (Fig. 9).

Among the machines which attracted a great deal of attention were two entirely new 'Nora' rotary automatic injection moulding machines shown by A. Nothelfer and Söhne of Ravensburg, Württemberg. These high speed machines incorporate a rotary turret head in which are combined six moulds which can

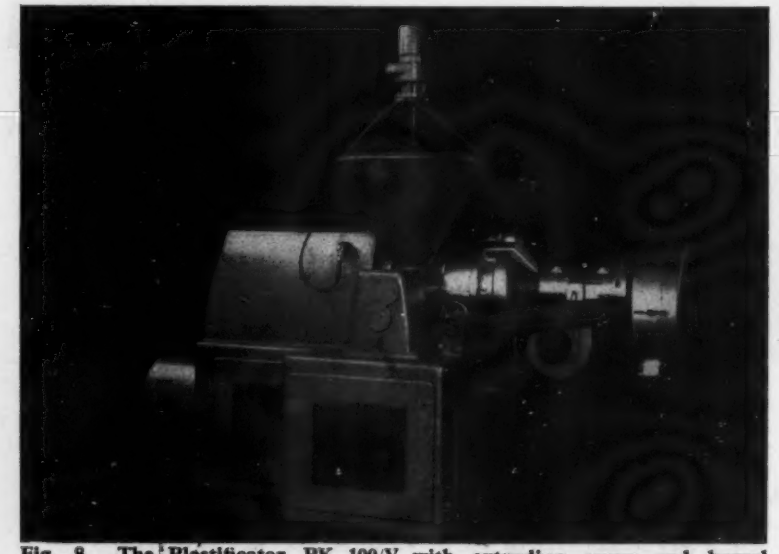

Fig. 8. The Plastificator PK 100/V with extruding screw and barrel temperature control. Werner and Pfleiderer

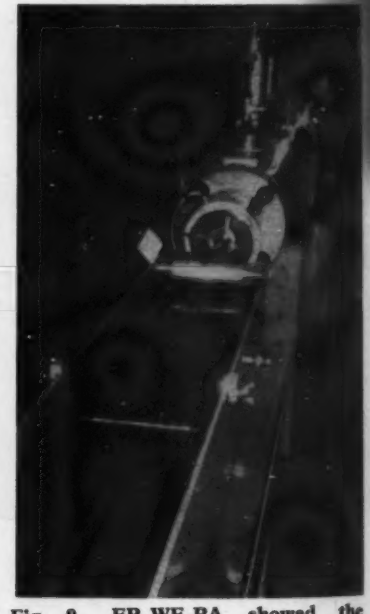

Fig. 9. ER-WE-PA showed the granulation of polythene by the technique of extruding $\frac{3}{8}$in. solid rod and whilst still hot, stretching the rod over a series of pulleys in water till it is pulled down to $\frac{1}{4}$in. ready for granulation at the end of the machine

Finding a way of making a sizeable addition to profits —without risk—is guaranteed to raise Board Room morale. This particular company uses expensive industrial solvents that used to go to waste after they had done their job. Now, a Sutcliffe, Speakman recovery unit traps them for re-use. Savings are substantial—the Board is beaming.

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VIEWS and REVIEWS

Light Sensitive Plastics

'PHOTOGRAPHY is facing the greatest revolution since the daguerrotype. This is the promise of photosensitive plastics.' Thus I/EC in its 'Forecast' (p. 29) in the issue of Vol. 51 (Part 1), No. 9, Sept. 1959.

'The first practical use,' it explains, 'a grainless, silver free, plastic base copying film, reached the commercial market less than a year ago. Projection slides and negatives are made simply by placing the film against the negative, exposing it to fluorescent light for a minute, then dropping the exposed film into boiling water.'

This refers to Dycril, a Du Pont product, which is not yet in the commercial stage, a light sensitive plastic, which 'looks like a good bet to revolutionize photocopying and printing.'

The method of procedure is a simple one: From a photograph of the subject the negative is exposed to Dycril plates under ultraviolet light, and the unexposed portions are removed by washing in an alkaline solution. 'What remains is a complete printing plate.' When the plate has been made it can be finished and mounted on a press in about 20 minutes.

Estimated Cost

The plant to prepare the plates is estimated at possibly as little as $5,000. Cost of photopolymer plate about $10 a square foot.

Materials of Construction

Part II of I/EC contains the *Thirteenth Annual Review of Materials of Construction*, and this covers the reviews of Elastomers, Fibres, Hard Rubber and Plastics. A few notes on some of these with a view to giving the technologist on this side of the Atlantic the high spots, as it seems to me, may be useful.

Elastomers

The review of Elastomers is by Dr B. S. Garvey, who surely needs no introduction to technologists on this side.

The most impressive news seems to me to be the announcement that 'A synthetic *cis*-polyisoprene which is competitive in price and quality with natural rubber is now on the market. On the theoretical side "heavy" *cis*-polyisoprene has been made by replacing all the hydrogen atoms by deuterium atoms.'

This seems to me to be offset by the remark—at the end of a review of progress in the NR industry—that 'Altogether the outlook for natural rubber seems brighter than ever.' However, the deduction from somewhat speculative considerations are not my object.

I found the statement that 'The annual specialty rubber for the year combines, at a price, the advantages of silicone rubbers with those of nitrile rubbers,' rather intriguing, and the following to which I believe attention has been directed on this page, of 'general interest': '... is the suit filed by Du Pont against Phillips Petroleum for infringement of its patent on linear polythene.'

Butyl and Silicones

The cures of butyl with phenol-formaldehyde derivatives which do not revert, and 'which resist temperatures 100°F. greater than do sulphur vulcanizates,' have been noted, and there are various references to results of its dynamic properties, especially at high temperatures.

Coming to the silicones there is a note on (*inter alia*) 'The oil and solvent resistance of the nitriles has been combined with the wide temperature range of the silicone elastomers.' There are also notes on the special compounds with low shrinkage properties for precision mouldings, and even tyres can be made for high temperature service with silicone rubbers and glass cords.

Polyurethanes

There is a mention of the fact that to the usual dibasic acid polyesters for making polyurethanes have been added the polyethers, and the esters of 'dimer acids' made from oleic and linoleic acids. Good products can be made from all types.

I cannot here cover the review of Fluoro Polymers 'Miscellaneous Rubbers,' 'Polymerization,' 'Vulcanization and Radiation,' 'Oxidation and Ozonization,' 'Pigments and Reinforcement,' 'Processing and Compounding,' 'Products' and 'Theoretical Studies,' but I must say a good word for the excellent *Bibliography*. This is subdivided under Natural Rubber, Latex, Diene Rubbers, Butyl Rubber, Silicone Rubbers, etc. There are more than *two pages*. At a rough estimate there must be some 200 references, including Reviews, Books, and Symposia and Panels Discussions. A mighty effort!

Fibres

I will not attempt to refer to all the fibres dealt with by Messrs C. S. Grove (Professor of Chemical Engineering and Director of Chemical Research at Syracuse University), Robert S. Casey (Chief Chemist of the W. A. Sheaffer Pen Co.), and Joseph L. Vodnik (Minnesota Mining and Manufacturing Co.), who have rotated primary responsibility for this fine review, but will (and must) confine myself with drawing attention to matters which are likely to have a special interest for British readers.

To begin with here is the Production in USA (*Modern Textiles Mag. 40*, No. 5, 30,-1959), and (*Textiles Economics Bureau*, Textile Organon, 28, No. 6, 77-92-1957).

1958 US PRODUCTION

	Million Pounds	% Change from 1957
Total man-made fibres	1,606.7	– 9
Acetate filament yarn	222.6	+ 7
Rayon	737.3	– 16
Textile glass fibres	103.4	– 5.5
Non-cellulosic fibres	489.0	– 5.0

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

New Fibres

In 1958, Eastman Kodak announced a new polyester fibre called Kodel, at present offered only in staple form. Very many advantages (high heat resistance, dimensional stability without heat setting or special processing, good covering power, natural whiteness, ready dyeability, excellent performance on all spinning systems and on conventional production and dyeing equipment) are among the properties claimed.

Two cross-linked cellulosic fibres, Corval and Topel, developed by Courtaulds (Alabama), are not only chemically, but physically different from other cellulosic fibres. Corval gives a soft, bulky, somewhat wool-like hand, making it suitable for blending with synthetic fibres. Topel can be blended with cotton acetate and nylon, to yield fabrics with a soft hand and good appearance. It is considered particularly good for blending with cotton.

Du Pont's new rayon yarn 272-F Cordura eliminates the need for special dipping for adhesion for rubber belts and hose. Among the Acrylics is Creslan, the long-awaited fibre of American Cyanamid.

The Celanese Corporation of America and Imperial Chemical Industry Ltd. have announced a joint subsidiary to make a synthetic textile fibre called Teron; it will be the fourth US producer of polyester synthetic fibre.

Nylon, Polyesters, and Acrylics

The total production capacity of the 12 producers of Nylon fibres in US has been continually increasing. In 1957 and 1958 close to 100 million pounds of added capacity came into being, but despite this, according to the authors of the article, the full versatility of the fibre has not yet been utilized, and marked expansion is expected to continue.

According to present plans, the production capacity of polyester fibre will increase sharply during the next two years to somewhat short of 200 million pounds per annum.

Tyres

On the subject of Tyres the authors state that 'One of the most important industrial outlets for industrial textiles is tyres.' At present the major contenders are nylon and rayon. This year 300 million pounds of rayon, and 125 million lb. of nylon will go into tyres; 1lb. of nylon does the work of 1.7lb. of rayon, 'but the struggle for the market has accelerated research on rayon and resulted in a super-super cord called *Tyrex*.' It is said of this that 1¼lb. is needed per tyre compared with 2lb. of the old cord. The new yarn has 50% greater strength than the 1650 denier, and no appreciable elongation.

There is mention of Goodyear's recently introduced new over-the-road truck (Lorry) tyres called Unisteel, which may have three times greater tread mileage than tyres made with fabric cords.

I can strongly recommend this fascinating review of 'Fibres in the US in 1958,' to all and sundry.

Notes

Anchor Chemical Co. call attention to Pepton 65 in ref. 145/R/59. They say: Pepton 65 is a very active peptizer for natural rubber at the low temperatures generally encountered in open mill mastication and at the beginning of Banbury plasticizing cycles. It has a much lower threshold temperature than that of the well-known peptizer Pepton 22. It is also effective in SBR. The *General Information* includes the following: *Chemical name:* Zinc 2-Benzamidothiophenate. *Appearance:* Off-white Powder. *Odour:* Practically Odourless. *Melting Range:* 200-230°C. *Specific Gravity:* 1.32. *Screen Test:* 99.9% through 100 mesh. *Toxicity:* Not believed to be toxic under normal conditions of use, but the precautions usual with any organic powder should be exercised. *Activity:* Very active at mastication temperatures above 65°C. *Dosage:* The use of 0.05 to 0.5% is recommended for natural rubber. Average dosages are in the range of 0.1–0.2%. *Dispersibility:* Disperses readily. *When to add:* For maximum effect, Pepton 65 should be introduced early in the mastication cycle before other ingredients have been added. Addition in the form of a 20% masterbatch is very effective.

Du Pont in *Elastomer Notebook* (1958/9) calls attention to 'Du Pont neoprene goes to sea on flexible barge,' and says 'A British manufacturer has introduced a flexible towed container for sea transportation of petroleum products. The collapsible barge has been extensively tested and the containers are now being used for commercial deliveries. Made of nylon fabric with an exterior coating of Du Pont neoprene synthetic rubber, the container is designed to resist sunlight, weathering, ozone, salt water, oil, abrasion and flex fatigue.'

PHILIP SCHIDROWITZ

Goodrich Tyres in Australia

The first Australian Goodrich tyre would come off the production line early in December, three months ahead of schedule, the managing director of B. F. Goodrich Australia Pty. Ltd., Mr W. L. Carpenter, said in Sydney. Tyres would not be marketed, however, before March next year. The establishment of this new £A3,500,000 tyre industry in Victoria is the result of a partnership between B. F. Goodrich of America and the Ampol Petroleum Ltd. The plant is situated 13 miles from Melbourne. Mr Carpenter said the plant would produce passenger car tyres at an initial rate of 1,100 to 1,200 tyres a day. This would increase as the efficiency of employees improves with training.

Malayan Discussions on Rubber Root-rot

Dr E. J. Miller, a leading American agricultural scientist, has arrived in Malaya to discuss with Malayan experts the possible application of a new chemical said to overcome root-rot in rubber trees. The fungus infection was reported to cause losses of up to 280 lb. of rubber an acre on Malayan plantations.

Dr Miller, chief international agriculturist for the Olin Mathieson Chemical Corporation, said in a statement here before his departure that the chemical was known as terrachlor and that he hoped to arrange tests in Malaya of it and another chemical, omazene, said to be effective against root-rot and other fungi.

Questions Corner—90

(Second Series)

379. Why are thickening agents required in formulations of polyvinyl acetate emulsions, and what materials are used?

380. Give some details of the heated tool method of welding thermoplastics.

381. In welding thermoplastic sheets, what are the main factors controlling the strength of the weld?

382. Several types of resins may be used for the production of glass reinforced plastics. What are they?

(Answers next week)

Answers to Questions Corner—89

375. When a polyvinyl acetate emulsion is pigmented or fillers added, surface active agents are added not only to improve the stability of the compounded emulsion, but also to improve their wetting properties.

It must be remembered, however, that the addition of surface active agents to these emulsions have an influence on the viscosity, and affect their flow characteristics. Also, there is a tendency to frothing during the processing and reduced water resistance of the film.

When anionic polyvinyl acetate emulsions are used only anionic or non-ionic surface active agents can be used although they may tolerate a very small quantity of cationic materials. If, on the other hand, cationic emulsions are used the converse applies.

Among the surface active agents that are employed are: *Anionic.*—Sulphonated alcohols, alkali salts of alkyl-aryl sulphonic acids. *Non-ionic.*—Polythene glycol ethers and esters. *Cationic.*—Long chain fatty acid amides, long chain quaternary ammonium compounds.

376. Nylon is available in the form of rod, sheet and tube, but the most economical form, when quantities justify it, is in the moulded form.

The main factors that recommend nylon as a material suitable for bearings are: 1. Low coefficient of friction; 2. good resistance to wear; 3. its elasticity enables it to withstand shock loads and vibration; 4. long life.

The main factor that limits its use for bearings is its inability to disperse heat. If a running temperature of over 150°C. is encountered the tendency will be for portions of the bearing to exceed the melting point of the material and cause the bearing to seize up. Another disadvantage is nylon's high linear coefficient of expansion (10 x 10^{-5}/°C.) and therefore the shaft speed should not be allowed to exceed 500 to 600ft./min. Wall thicknesses should be as thin as possible, and the bearing diameter should be about ½% greater than the shaft diameter. A normal press fit, as in the case of metal bearings, can be used for nylon.

During the running-in period it is important to use a lubricant. If the bearing is to be used later without lubricant it should be well greased on assembly, otherwise it may sieze up at a later date.

377. One outstanding advantage of urethane foams is that they can be foamed *in situ* without the application of heat and pressure. The foam rises, completely filling irregular cavities, and bonding well with the walls of the container. The foaming reaction is sufficiently exothermic to complete the curing of the foam.

This is of special value in the use of rigid foams for structural and insulating applications, and in the foaming of shaped articles in a mould.

Flexible foams are available with open cell structure in a density range of 2 to 6lb./cu. ft. and may be produced in a variety of colours. It can be produced so that it will not support combustion. These flexible foams are being used for cushioning and the flame resistant characteristics make it attractive for use in public transport.

Its open cell structure and good sound absorption suggests its use for acoustical applications. The high tear resistance suggests its use for toys.

Rigid urethane foams are available in a density range of 2 to 30lb./cu. ft. The adhesion to the walls of the container and impact and vibration resistance are good, as also dielectric properties, chemical resistance and thermal conductivity.

378. Polythene film is quite easy to heat seal and this fact has contributed very largely to its success in many applications. Printing on the film has presented some difficulty, but today specially processed polythene film, suitable for printing on, is being produced by several film manufacturers. These films have one or more surfaces which permit permanent bonding of the ink to the film.

For most purposes polythene film provides a good moisture vapour barrier. The oxygen and carbon dioxide transmission rates are high. Tear resistance is excellent.

With these brief details in mind the first application that is obvious is for food packaging where the low moisture transmission and easy exchange of oxygen and carbon dioxide, toughness and flexibility over a wide range of storage temperatures, freedom from odour, non-toxicity and good appearance recommend its use.

Fruit and vegetables are now being packed by the grower in large quantities. Trimming the tops of some of the vegetables, with the consequent saving in freight charges, has more than off-set the cost of bagging. The bag can be used by the customer again.

A comparatively recent development has been the introduction of a heat-shrinkable polythene film so that it is possible to package poultry for storage and future sales. A dressed bird is placed in a shrinkable bag, the bag is evacuated and tied, the whole being then immersed in hot water. The film shrinks and conforms to the irregular contours of the carcass and thus forms a protective skin.

Packaging for various chemicals is mostly in the form of linings for drums, cartons, etc. They may be used for both liquids and solids but naturally tests should be made to see that it is suitable for any particular application.

Dry goods, hardware, soaps, toys, etc., can be attractively packaged in polythene film, one important aspect being the protection it affords against dust collection during storage and display.

Polythene film is also being used as a permanent moisture barrier in building construction, and it does not deteriorate appreciably when in contact with soil. It may also be used as a lining for concrete forms and for covering fresh concrete. Very wide films (up to 32ft.) without seams have encouraged its use in this field.

Polythene film is also finding increasing use in horticulture and agriculture, *e.g.*, as a low cost roofing material for greenhouses and seed beds, mulching, conservation of soil moisture, etc.

For many applications a clear or translucent film is not necessary and where there is long exposure to sunlight it is advisable to use black polythene film.

(More questions next week)

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MEN and MATTERS

A Review of People and Events

by George A. Greenwood

I AM still hearing stories from members of the Plastics Institute party which visited Düsseldorf for the Plastics Exhibition there. The number of members who made the trip, 86 with the ladies, constituted a record for any party organized by the Institute—there have, in fact, now been six of these overseas visits and I understand that the next is to be to Utrecht, in October 1960, on the occasion of the 'Macro-Plastic' exhibition. Many complimentary things were said by members about the excellence of the organization by John Ratcliffe, Institute secretary.

I show here a photograph taken on the British Plastics Federation combined British stand at Düsseldorf while Mr J. V. Crossley was speaking at the Press reception given on the evening before the exhibition opened. Mr Crossley, who is Home Sales Director of I.C.I. Plastics Division and chairman of the BPF Publicity Committee, spoke in German, and I am told by one who was there that it was the best speech ever heard from behind a bar.

Upward Surge

There is plenty of evidence to show that chemicals and plastics and associated undertakings are participating quite nicely in the upward surge of industry. For example, Francis Shaw, the Manchester machinery makers, have recently received orders worth nearly £400,000 through their Canadian subsidiary. A £232,000 contract placed by the General Tire and Rubber Company, of Akron, Ohio, is for the export of rubber machinery to affiliated companies in Morocco, Holland and Spain. Other orders are for tyre vulcanizing presses and equipment worth £136,000 for a new tyre factory being built in Iran by an affiliate of the B. F. Goodrich Company.

A little while ago, I, with others, referred to a new company which has been formed largely by the Henley Company and the Tata Group for the manufacture of electric cables in India. More details now available give the name as Henley Cables India, and indicate the constitution of the board. Mr A. D. Shroff, who is not well known on this side of the world, but is chairman or director of many of the Tate companies, is chairman, and among other members of the board are to be Sir Alexander Sim, chairman of Henley's, and other British companies.

Earliest developments in India have included acquisition of a 40-acre site at Hadapsar, near Poona, for the erection of a factory and the manufacture in the first place of rubber insulated and plastic insulated cables of the house-wiring type and for the drawing of copper wire.

Uddeholm Appointment

As a result of the expansion of the company's activities Uddeholm Ltd., Crown Works, Northwood Street, Birmingham 3, have promoted Mr

A. G. SHAW

A. G. Shaw, formerly senior Midland Area representative, to be Midland Area Manager. In his new position Mr Shaw will be responsible throughout the Midlands for sale and service in the tool steel and heat treatment divisions of the company which, as is well known, is the British Associate Company of Uddeholms AB, the large and old-established Swedish steel-making, forestry and chemicals concern.

Mr J. V. Crossley, of I.C.I., speaking at a press reception on the eve of the opening of the Dusseldorf Exhibition

Water Storage

A 3,000-gallon cylindrical storage tank for de-ionized water has been manufactured by Cawley Plastics Ltd., Wey Lock Works, Byfleet Road, New Haw, Weybridge, Surrey, for the Mullard Radio Valve Co. Ltd.

The tank, in 'Tufplas,' a chemically bonded lamination of unplasticized PVC and chemical grade polyester resin reinforced with glass fibre, is 13ft. high and 7ft. in diameter. Mullards use de-ionized water for washing the component parts of radio valves.

Dusseldorf Reception

Among those present at a reception for overseas visitors given in Dusseldorf during the recent Plastics Exhibition were *(left to right)*: **1, W. T. Cruse (Society of the Plastics Industry, New York), F. Tschacher (Verband Kunststoff-Erzeugende Industrie—VKE—Frankfurt), J. E. Jansen (Swedish Plastics Association), A. Kraft (Gesamtverband Kunststoff Verarbeitende Industrie—GKV), G. Suhle (AVM) and W. Euler (Max Richter). 2, Dr Grocke (Degussa), Dr P. Esselmann (Dynamit AG), Dr R. Peukert (Tech. Hochschule, Aachen). 3, Prof. V. A. Kargin,** *centre* **(Moscow Academy, USSR) and Oberburgermeister G. Glock (Dusseldorf). 4, Mrs J. V. Crossley, Mrs H. F. Wilson, H. F. Wilson (president of the Plastics Institute). 5, O. Th. Wex, Mrs Veronika Hengstenberg (GKV), H. Seifert (NOWEA), Alfred Kraft (GKV). 6, Dr L. Kollek (Badische Anilin- & Soda-Fabrik), C. B. Copeman (chairman, Maclaren and Sons Ltd.). 7, A. Kraft, Mrs Huber (GKV, Frankfurt), F. Krotz (Rheinische Kamm-Fabrik). 8, R. Rowland (Editor,** *RJIP*), **Tor Corneliussen (Norway), F. Copeman (Maclaren and Sons), Miss Gisela Busch (*RJIP*). 9, John Ratcliffe (Plastics Institute), Tor Corneliussen (Zentralinstitut für Industrielle Forschung, Norway), Dr J. Pohjanpalo (Finland). 10, Prof. S. S. Medvediev (Moscow Academy, USSR), Prof. Koch (fourth from left, leader of the USSR delegation) and members of the USSR delegation**

Tyre Wear

IRI LONDON SECTION MEETING

MEMBERS at the second winter meeting of the London Section of the IRI on October 21, heard an interesting paper entitled 'How Tyres Wear,' by Dr Schallamach, with the chairman, Mr C. H. J. Avons, in the chair.

Dr Schallamach outlined the two possible methods of degradation which occur when a tyre wears, simple abrasion and chemical degradation. Both these might be present at one time but chemical degradation would only affect the rate, and not the mechanism, of abrasion.

In a preliminary investigation, patterns produced on heavily abraded tyres were compared with those on samples tested by various abrasion methods. Ridges similar to those formed on the specimens in the Akron abrasion test are observed on a worn tyre, these being at right angles to the direction of motion of the wheel. Softer tyres produce larger ridges giving higher wear rates than with a harder tyre.

Dr Schallamach said that abrasion was an elusive quantity to determine as no two tests measured the same effect; for example, no correlation had been found between the abrasion sustained by a sample over which a load was pulled (probably the simplest abrasion test) and that sustained by similar samples in the Akron abrasion test. When considering motor tyre wear, the most reliable test machine was the car itself and Dr Schallamach described a trolley which he had had constructed to test full scale tyres under specified conditions.

Although tyres wore during breaking and acceleration, most wear occurred when cornering. This was illustrated by an excellent film produced at the British Rubber Producers' Research Association Laboratories. The film was taken through a transparent surface which had a rubber wheel resting on it. This surface could be moved horizontally so that the wheel was made to revolve. In order to simulate all three wearing actions, the wheel could be braked, accelerated, or held at an angle to the motion of the surface. It was very easily seen from the film that any sliding and thus wearing action, is always confined to the rear of the area of contact.

Mathematical treatment of a simplified picture of tyre slip proved that highly elastic tyres would wear faster since they had a greater area of slip and thus produced more heat. It appeared from this that a tyre with low hysteresis was the best but a compromise had to be sought between low wear and a low rolling resistance which was favoured by a high hysteresis tyre. A further conclusion was that the wear on a tyre increased as the fourth power of the speed, a factor of great importance in view of the improved performance of many production cars.

The 5.30 lecture, given by Dr J. J. Mausner (Du Pont (UK) Ltd.) reviewed the compounding and uses of the newer neoprenes including blends containing the WB grade which show excellent processability. In cements, type AD shows advantages over type AC in respect of colour and solution stability. The fluid polymer, FB, has found application as a caulking compound and as a vulcanizable softener in compounds based on other rubbers. The discussion centred round the interesting use of raw linseed oil as an antiozonant for neoprenes.

Luxury Hot Water Bottle

A new luxury hot water bottle of velour-covered seamless latex is being produced for autumn and pre-Christmas sale by the Dunlop Rubber Company. Called the 'Deep Sleep' hot water bottle, this addition to the range will take boiling water, thus maintaining its heat for many hours. It comes in two colours, primrose and cherry, in a pack specially designed for display and protection in storage. The retail price is 25s.

Mr J. Christopher Ingram has accepted an invitation to join the Board of Redfern Holdings on December 1. He will also be assistant managing director of Redfern's Rubber Works.

KUNSTSTOFFE 1959

Continued from page 558

(approx. 0.53oz.) can produce up to 34 shots per minute, while the larger machine, the P.50, with an injection capacity of 50gm. (approx. 1.76oz.) can attain up to 20 shots per minute. The maximum injection volume of the P.15 is 14.75 cc. (0.9 cu. in.) and the plasticizing capacity 13.6 Kg./hr. (30lb./hr.). For the P.50 the corresponding figures are 49.2cc. (3 cu. in.) and 29.5–38.6Kg. (65–85lb./hr.).

In the rotary turret assembly, there are six auxiliary hydraulic cylinders and pistons, the ends of which carry the upper moulds and move them forwards and backwards; the lower moulds being fixed to the main revolving table (Fig. 10). The rotary movement of the entire mould table is effected by a separate piston. Accurate indexing is by automatic limit stop. The moulds are closed by the action of a closing cylinder, at the back of the mould support unit, which exerts pressure on the rear end of the mould carrier piston which is at the time in the injection position. The entire mould support unit is then moved forward by about 3in. Maximum closing pressure is exerted during the injection period; pressure during the subsequent cooling period being maintained by the mould carrier pistons.

In the injection unit, the plasticizing screw—electrically driven through an infinitely variable speed reducer (ratio 1:3)—acts as a ram during the injection cycle. Injection pressure can be controlled by an adjustable valve and by use of screws and barrels of different diameters. Four types are presently available giving injection pressures of up to 8,700 psi; 11,000 psi; 14,000 psi and 17,000 psi respectively. The machine can be operated under manual, semi-automatic or fully automatic conditions.

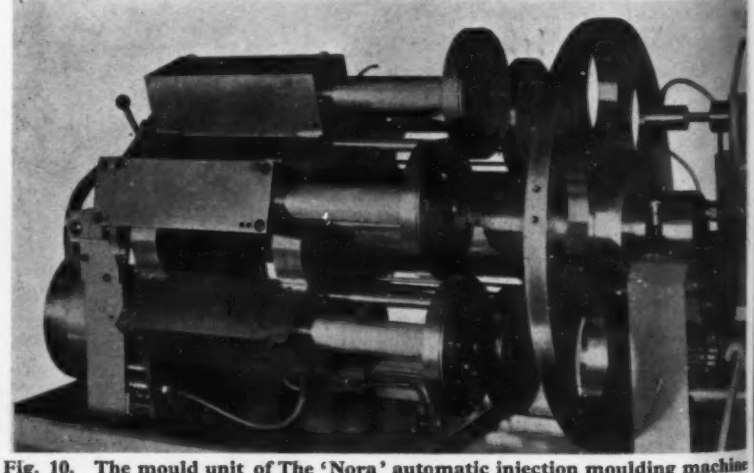

Fig. 10. The mould unit of The 'Nora' automatic injection moulding machine shown by A. Nothelfer and Sohne

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Unplasticized PVC Film

BLOW EXTRUSION

AN important advance in PVC technology has been made through the development by British Geon Ltd. of an unplasticized PVC compound especially designed for the production of crystal clear film by the blow extrusion process. Take-off equipment is a standard unit, slightly modified for handling unplasticized PVC film.

Close-up view of the die through which unplasticized Geon PVC is extruded

One of the chief difficulties that had to be overcome was due to the fact that, unlike other thermoplastic film-forming materials, unplasticized PVC has no sharply defined melting point and does not melt at processing temperatures. Stringent temperature control is essential and the temperature controlled zones need to be arranged in such a way that a continuous upward gradient from feed and to die end can be obtained.

The compound used in the production of this type of film is based on a Geon dispersion polymer with added stabilizer and lubricant. The extrusion process is carried out on a high quality 45mm. machine in its standard form with a barrel length/diameter ratio of 15:1, and a standard film blowing head.

Seven electrically heated zones are used, each of which is accurately controlled by its own thermostat. Three of these zones are situated in the barrel, one on the flange, two on the head and one on the die. The take-

Bottle Appeal Dismissed

The Court of Appeal on October 29 dismissed an appeal by Cannon Rubber Manufacturers Ltd. against a decision of Mr Justice Lloyd-Jacob granting P. B. Cow and Co. Ltd. an injunction restraining Cannon from infringing Cow and Co.'s registered design in respect of a rubber hot water bottle. The court also rejected Cannon's plea that the registration of the design should be revoked on the ground that it was not novel. The design involves ribbing, and Cannons marketed the bottle complained of under the name 'Cosy.' Cow's bottle is known as 'Airflow.'

Giving judgment, the Master of the Rolls (Lord Evershed) said that if the registration of Cow's design was valid, Cannon's bottle was an infringement because there were only minor differences. He was not satisfied however that Cow's design was purely functional or not novel, and he would dismiss the appeal. Lords Justices Sellers and Harman agreed.

The appeal was accordingly dismissed, with costs. Leave to appeal to the House of Lords was refused.

IRI News

COUNCIL MEETING

AT a meeting of the Council of the Institution held at 4 Kensington Palace Gardens, London, W.8, on Tuesday October 20 the following approvals were given:

Foundation Lecturer, 1960

The Council accepted unanimously the recommendation of the Manchester Section Committee that the 15th Foundation Lecture should be delivered by Mr Maldwyn Jones, Development Director, Imperial Chemical Industries Ltd., Plastics Division.

Nomination of Officers

The following nominations for 1959/60 were made, subject to confirmation at the annual general meeting: President, Sir John Dean; vice-presidents, Mr H. Rogers and Dr J. R. Scott in place of Lord Baillieu and Mr C. B. Copeman who retire under Rule 34; hon. treasurer, Mr S. D. Sutton.

Rubber Technology Conference 1962

The following nominations to the Conference Committee were made: Mr F. W. Ball, Dr L. C. Bateman, Mr J. M. Buist, Dr C. Falconer Flint, Mr B. J. A. Martin, Mr Geo. Martin, Dr W. J. S. Naunton, Dr L. Mullins, Dr J. R. Scott, Mr G. A. Shires, Mr S. D. Sutton, Dr W. F. Watson.

AGM and Dinner

The Annual General Meeting followed by the annual dinner will be held at the Queens Hotel, Birmingham, on Thursday December 17 1959.

INAUGURAL LECTURE, CORK

As a prelude to the setting up of an Irish Section of the Institution, a special lecture was arranged for Friday October 2 1959 at the Imperial Hotel, Cork. The Irish Dunlop Co. Ltd. kindly undertook the arrangements and offered hospitality to those taking part. The lecture which outlined the development of new polymers for special purposes was delivered by Dr W. C. Wake of the RABRM and Dr L. Mullins of the BRPRA, and enjoyed by a large gathering.

The lecture was preceded by a reception by the Lord Mayor of Cork followed by a dinner at the Imperial Hotel. In a speech in which he expressed grateful thanks to Mr Ryan and his colleagues in the Irish Dunlop Co. Ltd. for the arrangements they had made and for their hospitality Mr George Martin, chairman of Council, said that he hoped the very successful meeting that day would be the forerunner of a long series.

ISR Open Days

RUBBER MANUFACTURERS TOUR YEAR-OLD PLANT

RUBBER manufacturers from all over the country have recently been visiting the International Synthetic Rubber Company's plant at Hythe, Southampton, the most up-to-date plant of its kind in the world. Last week, on October 29, as part of the celebration of the first anniversary of full stream production, the company acted as host to some 60 to 70 manufacturers. Divided into groups, ISR's guests toured the production line from start to finish, beginning at the chemical storage and solution make-up sections, and continuing past the polymerization stage, where the fundamental reactions take place to produce an emulsion of rubber particles in water, through the recovery area—where unused butadiene and styrene are stripped—to the finishing stage where the latex is coagulated, washed and dried, pressed into 80lb. bales and automatically wrapped.

At the luncheon which followed the tour, Mr D. A. Bennett, director and general manager of ISR, spoke of the increasing demand for synthetic rubbers. From early next year, the output from the ISR plant, including latex, would be at a rate of 77,000 tons a year. That output could be increased, within six months of such a decision being made, to 90,000 tons. It was the object of the company, he said, to supply all the UK rubber industry, and ISR would do its best to achieve this even though synthetic rubber might not be far from going into short supply. The company was alert to new developments and had also ideas of its own. In the course of the next year or two, he concluded, it would be possible for rubber manufacturers to obtain from ISR the best materials and the newest materials obtainable anywhere in the world.

In replying for the guests, Mr S. A. Parr (Hytex Ltd.) said that the visitors had been absolutely fascinated. The plant, he added, seemed wonderfully efficient, and it was comforting to know that the smaller manufacturers were to be taken care of. He concluded an excellent and amusing speech by stating that if there was one really easy job in the world today it must be that of selling synthetic rubber.

Among the number of questions afterwards raised, emphasis was laid on the importance to the smaller manufacturers of carbon black masterbatches. The smaller manufacturers, it was stressed, did not like to carry black on the premises. In reply, assurance was given that ISR would go into production of such masterbatches when the volume of demand warranted this. The difference between 'hot' and 'cold' synthetic rubbers was queried, and it was explained that ISR's 'hot' rubber was made at about 60°C. whereas the 'cold' rubbers were made at temperatures around freezing point.

At present there are six solid SBR rubbers made by ISR and marketed under the name of Intol. These are as follows: Intol 1500, a general purpose rubber. Non-staining Intol 1502. Oil-extended Intol 1710 (extended with an aromatic oil in ratio 37.5 parts of oil to 100 parts polymer by weight). Oil-extended Intol 1712 and oil-extended Intol 1778, and finally the 'hot' non-staining Intol 1006. There are also two low solids latices R23 and M23.

National Safety Conference

PROGRAMME

THE fourth National Safety Conference for the Rubber Manufacturing Industry will be held in London on Tuesday November 17 and Wednesday November 18 1959. The conference, under the chairmanship of Mr G. E. Beharrell, chairman of the Dunlop Rubber Co. Ltd., will be held at the Assembly Hall of the Royal Commonwealth Society, Northumberland Avenue, London, W.C.2. Mr R. W. Lunn will act as conference chairman and the proceedings will commence at 2 p.m. on October 17. The opening ceremony will be performed by Mr Edward Heath, the Minister of Labour and National Service.

The programme for the conference will be as follows:—

First Day

An address by H.M. Chief Inspector of Factories, Mr T. W. McCullough, O.B.E.

A session during which a panel of experts, consisting of Mr McCullough, Sir Thomas Williamson, C.B.E. (General Secretary of the National Union of General and Municipal Workers), and Mr R. W. Lunn will answer questions on all aspects of safety in the industry. Sir George Pollock, Q.C., Director of the British Employers' Confederation, will act as chairman of this session.

A talk by Mr. W. M. Larke (general manager (general), Stewarts and Lloyds Ltd., and deputy chairman of the Accident Prevention Committee of the British Iron and Steel Federation) on the subject of 'The responsibility of Management for the Prevention of Industrial Accidents.'

Second Day

A talk by Mr R. Hillier (H.M. Superintending Inspector of Factories (East and West Ridings (Sheffield) Division) entitled: 'A systematic attack on Non-Technical Accidents.' An interesting film dealing with this subject will also be shown during this session.

A talk by Mr J. Gordon Scott (Head of the Accident Prevention Dept., Midland Employers' Mutual Assurance Co.) on 'Safety from the Insurance Company's point of view.'

A panel including Mr S. F. Smith (chief safety officer, Dunlop Rubber Co. Ltd.) and Mr H. Jackson (director, Leyland and Birmingham Rubber Co. Ltd.) will deal with a number of technical matters including 'The Implementation of the report on Running Nip Accidents,' and 'The Guide to the 1952 report on Safe Working on Horizontal Two-Roll Mills.'

Polyflex 100

Grades of Polyflex 100 polystyrene sheet manufactured by Monsanto Chemicals Ltd. are now available for vacuum forming and pressure forming. Modifications in forming techniques and equipment have overcome former problems of orientation tension during thermo-forming operations. The general physical and chemical properties of the new grades are identical with those of the standard material previously available. The new products, known as Polyflex 100 vacuum forming grade and Polyflex 100 pressure forming grade are supplied in gauges from 0.003in. to 0.020in. and in standard roll widths of 21in. and 42in.

Mr John F. Gates, regional director for Central and Southern Africa of Cyanamid International, has been appointed regional director, Africa.

Natural Rubber Research

SIR GEOFFREY CLAY OUTLINES PLANS

SIR GEOFFREY CLAY, the Controller of Research in Malaya, at a Press conference in Kuala Lumpur after a meeting of the Malayan Rubber Fund Board, announced some of the decisions taken and plans made for co-ordinating research and development both in Malaya and outside this country.

The Malayan Rubber Fund is responsible for the use of funds received from the .75 cent a lb. cess on rubber exported from Malaya and contains rubber industry and Government representatives.

Some of the proposals Sir Geoffrey discussed were those for closing down the rubber-in-roads research and publicity programme in the US, though not in other more promising countries, and for arranging for a permanent work study group in Malaya to help increase efficiency and productivity in the industry.

Sir Geoffrey said that the Malayan Rubber Fund Board at its meeting had considered a paper on the value of operational research in the rubber industry which had been mentioned in the Blackman Report (the Blackman Committee reported in 1957 on production development and consumption research) to get better use from labour and improve management on estates. This committee had considered the advantages of private consultants being employed to make a survey but he felt that there was a need for a permanent organization to make a continuous study of the problem.

Work Study

In Britain he had discussed the matter with Imperial Chemical Industries who had a continual work study project employing three times the number of staff employed by any private consultant. They were achieving savings of 8% a year compared with 2 to 2½% for industry generally. Recently I.C.I. had visited the West Indies to see whether the techniques evaluated in I.C.I. were applicable to cane sugar production and they were optimistic of applying these techniques to the plantation industry and other long-term crops.

'They have offered to assist if the board will agreed to setting up a unit in this country rather than employing private business consultants,' he said. 'They feel, and I agree, that it should be a continuous operation dealing with the problems of labour, efficiency and management.'

The Malayan Rubber Fund Board had agreed to the scheme in principle but had deferred a decision on details. It had been suggested that an I.C.I. expert should visit Malaya to survey the problem. If his report was favourable, the head of the proposed unit in Malaya might visit Britain for 10 weeks or so before returning with the I.C.I. expert to get the unit started. Sir Geoffrey said that the former head of the statistics division of the Rubber Research Institute, Mr D. Westgarth, had been suggested to head the new unit with a Malayan as an understudy.

Referring to control of various bodies, Sir Geoffrey mentioned a recommendation that a London representative of the Malayan Rubber Fund Board be concerned with the activities of the Natural Rubber Producers' Research Association, the Natural Rubber Development Board, and its office in America, the Natural Rubber Bureau, and Rubber Technical Developments Ltd. Now that Malaya was independent and would continue to be the source of funds, it was important that Malaya should exercise control.

The Government had asked for more time to consider this suggestion and related suggestions, and the Malayan Rubber Fund Board had set up a sub-committee which was expected to meet shortly.

The board had also confirmed that a natural rubber research conference should be arranged for next year so as not to clash with the Rubber Study Group meeting. He hoped that something could be done to 'straighten out' views on the activities of various related bodies.

Rubber in Roads

The board had also considered a paper on the operation of the road research unit which had been continuing for some years in the US.

Sir Geoffrey said: 'I came to the conclusion that there is such a marked and lively interest by synthetic producers that there is not much hope of natural finding a large market for rubber in roads as against the stable prices, accessibility and sureness of supplies which synthetic can offer together with technical advisory services. I had recommended discontinuing that project and the publicity programme and using such funds in a more useful line of work, that is technical advisory services in the United States.'

The decision had been left to him by the Malayan Rubber Fund Board, he said, and he had decided that it should not be continued much longer as it cost $US128,000 a year and was not absolutely certain of good results. 'The private synthetic interests are all keen on rubber in roads and I feel that they have the edge,' he said. 'I lean towards thinking that we can spend our money better on advisory services rather than continuing an indefinite project of putting natural rubber and asphalt in trial strips.'

They would continue to have a liaison officer of the Natural Rubber Bureau in Washington to 'keep an eye' on rubberized road trials.

Speaking of technical advisory services, Sir Geoffrey said no one could fail to be impressed by the advisory services of the synthetic industry which were sometimes in a position to suggest their own product in preference to natural.

They had spent about US$1 million world-wide on rubberized road trials and promotion and it was estimated that if the US programme was stopped there would be an immediate saving next year of US$80,000.

Overseas Mission

On the question of the proposed overseas mission by the rubber industry, which would try to increase natural consumption, particularly in those countries that were small and not likely to develop synthetic industries, he said a sub-committee had been formed to inquire into alternative means and cost of what was in some ways a marketing survey.

Sir Geoffrey said that the Government had also asked for time to consider suggestions regarding the future of the Board of Management of the Rubber Research Institute in Malaya, as the Malayan Rubber Fund Board was now the only source of finance.

He felt that there was now no reason for an intervening body such as the Board of Management and it had been suggested very strongly that there should now be a General Purposes Advisory Committee to deal with administrative matters and a Research Advisory Committee which would assist the director of the Institute. He felt more and more that the scientifically trained staff, including the many outstanding men working for private establishments in Malaya, should be on a strong research advisory committee. They could use their knowledge of the industry and their knowledge of scientific needs to discuss intelligently a programme of research divided between the work that was best done privately and the work that was best done by the RRI.

With other suggestions being considered, this would bring a co-ordination of research being carried out in Malaya and between Malaya and overseas bodies.

He felt also that the smallholding advisory service of the Institute should be strengthened. At present assistant rubber instructors had about 20,000 acres of rubber smallholdings which was too much for them to come to intimate terms with the smallholders. By bringing this proportion down to 5,000 acres, or about 1,000 to 1,200 smallholders, they should be able to do more useful work.

He pointed out that in Malaya about 900,000 acres of rubber was in smallholdings of less than 25 acres.

During the conference, Sir Geoffrey said that it had been agreed to change the name of the British Rubber Producers' Research Association to Natural Rubber Producers' Research Association 'for obvious reasons.'

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Synthetic Rubber Prices

Prices of synthetic rubbers appear regularly in RUBBER JOURNAL AND INTERNATIONAL PLASTICS *in the first week of each month. It will be appreciated if suppliers will give notification of any price changes or additions to their range. Cif duty paid quotations are subject to slight variation due to exchange, ocean freight and insurance fluctuations. Prices are in pence per lb., except where otherwise stated.*

(e-qdp)—Ex-quay duty paid (cifUKdp)—cif UK duty paid (ddp)—Delivered duty paid
(e-sUK)—Ex-store UK (ex-wUK)—Ex-warehouse UK (d)—Delivered

SBR TYPES AND HIGH-STYRENE RUBBER

Ameripol (Goodrich Gulf) (min., 70,000-lb. lots)	(e-qdp)
1000 Hot, Non-Oil	23.10
1001 „ „	23.10
1002 „ „	23.34
1006 „ „	23.34
1007 „ „	23.34
1009 „ „	23.71
1011 „ „	23.71
1012 „ „	23.24
1013 „ „	23.94
1500 Cold, Non-Oil	23.10
1501 „ „	23.10
1502 „ „	23.10
1703 Cold, Oil-Extended, 25% oil	*20.31
1705 „ „ „ „	*20.07
1707 „ „ 37.5% oil	*18.89
1708 „ „ „ „	*18.89
1710 „ „ „ „	*18.66
1712 „ „ „ „	*18.66

* Under 70,000 lb., min. 600 lb.

ASRC (American Synthetic Rubber Corpn.) (carloads lots of 30,000 lb.)	(cifUKdp*)
1000 Hot, Non-Oil	23.99
1001 „ „	23.99
1004 „ „	23.99
1006 „ „	23.99
1009 „ „	24.61
1018 „ „	26.74
1019 „ „	26.26
1500 Cold, Non-Oil	23.99
1502 „ „	23.99
1503 „ „	26.02
3110 „ „	25.78
1703 Cold, Oil-Extended	20.69
1708 „ „	19.27

* US/£ conversion rate $2.80

Cariflex (Shell Chemical Company)	(e-sUK)
S-1000 Hot	22.0
S-1002 „	23.375
S-1006 „	22.0
S-1009 „	24.0
S-1011 „	24.0
S-1013 „	24.0
S-1100 Hot/black	19.75
S-1500 Cold	22.0
S-1502 „	22.0
S-1509 „	22 0
S-1600 Cold/black	19.625
S-1602 „ „	19.625
S-1605 „ „	19.375
S-1703 Cold, Oil-Extended	20.25
S-1707 „ „	17.75
S-1709 „ „	17.5
S-1712 „ „	17.5
S-1803 Cold, Oil/Black Masterbatch	17.875

Copo (Copolymer)	(cifUKdp)
1006 Hot, Non-Oil	23.25
1500 Cold, „	23.25
1502 „ „	23.25
1505 „ „	26.00
1712 „ Oil-Extended	18.50
1778 „ „	18.75
3900 „ Rosin-Extended	23.125

FR-S (Firestone)	(cifUKdp)*
1000 Hot	23.187
1001 „	23.187
1004 „	23.187
1006 „	23.187
1500 Cold	23.187
1502 „	23.187
146 „	23.187
1703 Oil-Extended	20.125
1712 „	18.5
123 „	19.187
155 „	18.5
173 „	20.125
178 „	18.75
1009 Specialty	24.625
1010 „	25.812
1012 „	24.187
1013 „	24.875
1014 „	27.75
1015 „	28.75
141 „	28.625
158 „	29.562

*US/£ conversion rate $2.80

International Synthetic Rubber Co.	(ex-wks)
Intol 1500	22
Intol 1502	22
Intol 1710	17.5
Intol 1712	17.5

Philprene (Phillips)	(e-qdp*)
1000 Hot, Non-Pigmented	23 28
1001 „ „	23.28
1006 „ „	23.28
1009 „ „	24.69
1010 „ „	25.86
1018 „ „	26.80
1019 Hot, Non-Pigmented	26.33
1100 Hot, Pigmented	19.65
1104 „ „	19.28
1500 Cold, Non-Pigmented	23.28
1502 „ „	23.28
1503 „ „	26.10
1601 Cold, Pigmented	19.56
1605 „ „	19.28
1703 Cold, Oil-Extended	20.23
1706 „ „	19.94
1708 „ „	18.82
1712 „ „	18.58
1803 „ Pigmntd, Oil-Extended	17.78
1805 „ „ „	15.99

*US/£ conversion rate $2.81½

Plioflex (Goodyear)	(fasUSport US Cents per lb.)
1006 Hot, Non-Pigmented	23.25
1500 Cold, Non-Pigmented	23.25
1502 „ „	23.25
1703 Cold, Oil-Extended	20.00
1710 „ „	18.25
1712 „ „	18.25
1713 „ „	16.9
1714 „ „	16.65
1773 Cold, Oil-Extended, Light-Coloured	20.00
1778 Cold, Oil-Extended, Light-Coloured	18.5

Polysar (Polymer UK)	(e-sUK)
S Hot	22
S-630 Hot	22
Kryflex 200 Cold, for Cables	23.5
Krylene NS „ Non-Staining	22
Krynol 651 „ Oil-Extended	17.5
Krynol 652 „ „	17.75
S-X 371 Process Aid	24

Synpol (Texas-U.S. Chemical Company)	(cifUKdp)
1000 Hot, Non-Oil	23.10
1001 „ „	23.10
1002 „ „	23.34
1006 „ „	23.20
1007 „ „	23.20
1009 „ „	23.71
1012 „ „	23.24
1061 Hot, Non-Oil	23.10
X-274	25.32
8000	23.94
1500 Cold, Non-Oil	23.10
1502 „ „	23.10
1551 „ „	23.10
1703 Cold, Oil-Extended	20.13
1707 „ „	18.71
1708 „ „	18.71
1711 „ „	18.62
1712 „ „	18.48
8200 „ „	18.71
8201 „ „	17.20
8150 Cold, Black Masterbatch	19.46
8253 Cold, Oil and Black Masterbatch	16.20
8254 Cold, Oil and Black Masterbatch	15.83
8256 Cold, Oil and Black Masterbatch	16.33

US/£ conversion rate $2.80

SBR LATICES

Copo (Copolymer) (10-ton lots)	(cifUKdp)
2101 (dry weight)	46.30
X-765 („ „)	40.80
X-800 („ „)	37.20
2102 („ „)	38.00
2105 („ „)	38.00
2110 („ „)	38.00

Naugatex (Naugatuck Chemical International)	(ex-wUK)
2000	39
2001	39
2002	39.5
2006	43
2105	40
2107	40
2108	40
2711	39
2714	39
2733	39
2740	43

Pliolite Rubber (Goodyear)	(d)
2000	40

Latex	
2001 (dry weight)	40
2104 „ „	40
2105 „ „	40
2108 „ „	40
5350 „ „	40

Pliolite Resin (Goodyear)	(d)
101A (dry weight)	44
150 („ „)	50
151 („ „)	35
160 („ „)	50
170 („ „)	50

Hycar (B. F. Goodrich)	(ddp)
2507 (high styrene) dry weight	48

Polysar (Polymer UK)	(e-sUK)
Latex, type IV	32.5
Latex, type 721	31.75

International Synthetic Rubber Co.	(ex-wks)
Intol Latex R23	22
Intol Latex M23	22

ACRYLONITRILE TYPES

Butaprene N (Firestone)	(cifUKdp)
NL	52.5
NAA	56.25
NF	51.5
NXM	60.18

Chemigum	(e-s)
N—1	75
N—3A	52
N—5	52
N—6G	45
N—7	45
N—8	45
N600X	45

Hycar (British Geon) (500-lb. lots and over)	(UKd)
1001 High Nitrile Hot	52
1041 „ „ Cold	52
1002 Medium High Nitrile Hot	45
1042 „ „ „ Cold	45
Hycar (B. F. Goodrich) (500-lb. lots and over)	(ddp)
1411 High Nitrile (powder)	66
1432 Medium High Nitrile (crumb)	64
1072 Medium High Nitrile (carboxyl)	66
1312 Medium High Nitrile (liquid)	55
1043 Medium Low Nitrile	51
1014 Low Nitrile	61
I.C.I. (min. 5-cwt. lots)	(UKd)
Butakon A-4051 High Nitrile Cold	52
Butakon A-3051 Medium Nitrile High Mooney Cold	45
Butakon A-3002 Medium Nitrile Low Mooney Cold	45
Paracril (US Rubber)	(e-sUK)
18-80 Low Nitrile	63
AJ „ „	50
B Medium Low Nitrile	51
BJ „ „ „	51
BLT „ „ „ Cold	51
BJLT „ „ „ „	51
C Medium High Nitrile	59
CLT „ „ „ Cold	59
CV „ „ „(crumb)	60
D High Nitrile	67
ALT	51
Polysar (Polymer UK)	(d)
Krynac 800 Medium Nitrile	45
Krynac 802 Low „	45
Krynac 803 Medium „ (low Mooney)	45
Krynac 801 High Nitrile	52

ACRYLONITRILE LATICES

Butaprene N (Firestone)	(cifUKdp)
N-300 (dry weight)	53
N-400 („ „)	60.5
Chemigum Latex (Goodyear)	(d)
200 (dry weight)	65
235 CHS („ „)	60
236 („ „)	60
245 B („ „)	52
245 CHS („ „)	52
246 („ „)	52
247 („ „)	52
248 („ „)	52
Hycar (B. F. Goodrich) (dry weight, 3 drums and over)	(ddp)
1551 High Nitrile (large particle)	66
1552 Medium High Nitrile (large particle)	57
Hycar (British Geon) (dry weight, 3 drums and over)	(UKd)
1561 High Nitrile	60
1571 „ „ (carboxyl)	60
1562 Medium High Nitrile	52
1577 „ „ „ (modified)	

ACRYLIC TYPES

Hycar (B. F. Goodrich)	(ddp)
4021 Slab, 500 lb. and over	144
4501 Latex, dry weight	96

BUTYL TYPES

Esso	(e-sUK)
Regular 035	21.75
Regular 150	21.75
Regular 215	21.75
Regular 217	21.75
Regular 218	21.75
Regular 325	21.75
Non-staining 065	22.75
Non-staining 165	22.75
Non-staining 265	22.75
Non-staining 267	22.75
Non-staining 268	22.75
Non-staining 365	22.75

Vistanex (Polyisobutylene)	(e-qdp)
MS Low molecular weight	54
MH „ „ „	54
L-80 Medium molecular weight	54
L-100 „ „ „	54
L-120 „ „ „	54
L-140 „ „ „	54
Polysar (Polymer UK)	(e-sUK)
Butyl 100	21.75
Butyl 200	21.75
Butyl 300	21.75
Butyl 301 (non-staining)	21.75
Butyl 400	21.75
Butyl 101 (non-staining)	26.25
Butyl 402	22.5
Hycar (B. F. Goodrich) (500 lb. and over)	(ddp)
2202 Brominated	68

NEOPRENES

	(e-qdp)
W and WHV (dry weight del)	42.62
WRT („ „ „)	48.37
WX („ „ „)	44.62
GN („ „ „)	44.62
GNA („ „ „)	44.62
GRT and S („ „ „)	45.62
AC („ „ „)	57.125
KNR („ „ „)	75.62
AC'M'and'S' („ „ „)	57.125
CG („ „ „)	57.125
AD („ „ „)	57.125
Latices—Dry (per lb. del, min. 50 lb.)	
571	49.75
842A	49.75
572	51.25
601A	51.87
650	54.125
735	51.25
736	51.25
950	58.25
60	51.87
750	51.25
635	53.62

SILASTOMER

Midland Silicones (500 lb. lots del)	
Stocks	16s. 6d. to 35s.
Pastes	26s. to 35s.
Gums and base stock	36s. to 42s.
Cold-curing silicone rubber	20s. and 23s. 6d.

REINFORCING RESINS AND RUBBERS

I.C.I. (min. 2-ton lots)	(UKd)
Butakon S-8551	36.5
Butakon S-7001	33.5
Hycar (B. F. Goodrich)	(ddp)
2007 (powder)	42.5
Pliolite (Goodyear)	(d)
S—6B	36.5
Polysar (Polymer UK)	(e-sUK)
SS-250 (high styrene) (bale form)	27.25
SS-250 („ „) (flake form)	27.5
Kryflex 252 (high styrene)	25.5
Cyclite (Durham Raw Materials)	42

HYPALON

In 50-lb. bags del UK	71.62

Stockpile Disposals

Sales from the Board of Trade stockpile between October 19 and the end of the month totalled 3,667 tons for delivery as follows: Spot, 542 tons. November delivery, 960 tons. December delivery, 1,755 tons. January delivery, 410 tons.

Stocks at the Board's depots at the end of October including rubber sold for forward delivery, amounted to 92,039 tons.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

Leicester Section.—Tuesday November 10 at the Grand Hotel, Leicester. Twenty-fifth Anniversary Dinner-Dance.

London Section.—Tuesday November 10 at the Wellcome Foundation, 183 Euston Road, London, N.W.1, at 5.30 p.m. 'Processing the Newer Elastomers,' by D. A. W. Izod (RABRM), and at 7 p.m., 'The Utilization of Man-Made Fibres in the Rubber Industry,' by G. A. Pittman (Courtaulds Ltd.).

Midland Section.—Monday, November 9 at the Grand Hotel, Birmingham, at 6.45 p.m. 'Towards the Quantitative Understanding of Rubbers,' by Professor G. Gee, C.B.E., F.R.S. (Manchester University).

Preston Section. — Monday November 9 at the BTR Industries Social Club, Farington, Preston, at 7.15 p.m. 'Recent Advances in High Tenacity Rayons,' by Mr G. A. Pittman, B.Sc. (Courtaulds) Ltd.

West of England Section.—Wednesday November 11 at the George Hotel, Trowbridge. 'Recent Developments in Butyl Rubber.' Polymer (UK) Ltd.

PLASTICS INSTITUTE

The conference on 'The Influence of Plastics in Building,' will be held at the Royal Institute of British Architects, 66 Portland Place, London, W.1, on Thursday and Friday, November 19 and 20.

Scottish Section.—Wednesday November 11 at More's Hotel, Glasgow, at 7.30 p.m. 'What the Shipbuilding Industry Requires of the Plastics Industry,' by D. N. Wallace (Cunard Steamship Co. Ltd.).

South Wales and Monmouthshire Section.—Wednesday November 11 at the Grand Hotel, Cardiff, at 6.30 for 7 p.m. 'Costing and Estimating in the Plastics Industry,' by J. I. Keith, C.A., Hon. M.A. (The British Xylonite Co. Ltd.).

Southern Section.—Thursday November 12 at The Chemistry Department, The University, Southampton, at 7.30 p.m. Joint meeting with the Mid-Southern Counties Section of the Royal Institute of Chemistry. 'Inorganic Polymers,' by F. G. R. Gimblett (Brunel College of Technology).

Development and volume production of a new synthetic rubber latex as a 100% replacement for natural latex in foam rubber has been announced by the Goodyear Tire and Rubber Co. in the US. The company's foam products division has also announced that it is converting entirely to the new latex in the manufacture of airfoam cushioning materials. The new latex—called Pliolite 5352—will be marketed to foam manufacturers at 20 to 30% under the natural latex price.

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

THE great boom in share prices has showed no signs of slowing down in the past two or three weeks. The buying of top grade industrial shares has again been heavy and the trading volume has been sustained. There is very little evidence of the sellers being active on a large scale.

However, there is no doubt that buyers are becoming more and more wary of prices at the present level, whether in fact they are justified is entirely another matter. It would appear that the institutions in the City have still vast sums of money in hand —money that will have to find a resting place. This investment cash could be used to act as a brake in the event of a large fall.

In the Plastics and Rubber Manufacturing sections of the market there has been great activity. IMPERIAL CHEMICAL shares have become the favourite of the market. They are recommended by nearly every broker and, the fact that the yield is under 3%, does not seem to discourage this enthusiastic support.

The ordinary shares of ENGLISH CHINA CLAYS have shot ahead to a new high of 75s. This move is based on the belief that the company should now be doing exceptionally well following the recent increase in paper and news print sales.

The ordinary shares of BRITISH XYLONITE have been supported and are now only pennies off the 70s. level. The recent production figures from the plastics industry have satisfied the City and the shares of the companies concerned have responded accordingly.

BAKELITE ordinary have been bustled up to 40s. At one stage the rise appeared to be based on take-over talk, which was, of course, denied. Now the 'rumours' are of 'pending developments,' but most observers seem to think that the optimistic price might well be fully justified on the basis of earnings in the current year.

DANNIMAC ordinary which currently yield under 1% and are therefore one of the most highly regarded shares in the whole market, managed a further rise of 6d. to 8s. 3d. The rise in DISTILLERS ordinary has slowed down in the past week. Even so the shares have still doubled in value since the low of 1958.

The boom in rubber shares has been largely responsible for the sudden spurt in HARRISONS AND CROSFIELD ordinary. One feels that had it not been for the threat of a price war among the large tyre manufacturers DUNLOP ordinary would have shown greater response to the market's current mood.

ANGLO - AMERICAN VULCANIZED FIBRE ordinary failed to respond to a rather optimistic full report and accounts which disclosed that turnover in the current year was showing an increase of around 25%.

There was a sharp rise in the ordinary and 'A' ordinary units of the MCKECHNIE BROTHERS group. The

Continued on page 575

Share Price Movements

Par Value	Company	1958-59 High	Low	Oct. 31	Latest
5/-	Albright & W. Ord. ..	28/-	13/4½	26/6	28/-
£1	„ „ „ 5% Pref...	16/7½	15/4½	16/4½	16/3
5/-	Anchor Chemical Ord...	18/-	10/3	15/6	18/-
5/-	Andersons Rub. Ord. ..	4/3½	3/-	3/1½	3/1½
2/-	Anglo-Amer. Vulc. Fibre Ord.	4/3	2/-	3/9	3/10½
£1	Angus Geo. Ord. ..	35/-	21/-	33/6*	34/6*
5/-	Ault & Wiborg Ord. ..	23/-	11/9	22/6	21/-
£1	Avon India Rubber Ord.	43/3	27/-	43/-	42/6
£1	„ „ „ 6% Pref.	18/6	17/3	17/6	17/6
10/-	Bakelite Ord.	40/-	17/-	33/9	40/-
£1	„ 6% Pref. ..	19/6	18/3	18/1½	18/9
£1	Baker Perkins Ord. ..	49/9	30/7½	45/-	49/6
4/-	Bank Bdg. Rubber Ord.	3/1½	1/6	3/1½	3/1½
5/-	Boake (A.) Roberts Ord.	19/9	9/-	18/6	19/6
£1	„ „ „ 5% Pref.	15/1½	13/9	15/-	15/-
4/-	Brammer H. Ord. ..	15/9	9/6	13/6	15/7½
5/-	Bridge, David Ord. ..	36/10½	16/3	32/-	36/10½
5/-	Bright, John Ord. ..	16/3	8/9	15/6	16/3
2/-	Brit. Ind. Plas. Ord. ..	9/9	4/9	8/3	9/7½
2/-	„ 10% (tax free) Pref.	5/9	4/7½	4/3	4/1½
£1	British Xylonite Ord. ..	69/9	28/6	62/6	69/9
£1	„ „ 5% Pref.	15/9	14/-	15/7½	15/7½
5/-	BTR Ind. Ord.	13/3	8/1½	9/-	10/3
£1	„ „ 7½% Pref. ..	22/9	20/9	22/6	22/6
£1	Courtaulds Ord... ..	52/9	20/-	49/9	52/9
£1	„ 5% 1st Pref.	18/6¾	15/7½	17/-	17/-
£1	„ 6% 2nd Pref.	20/3	17/1½	20/-	20/3
4/-	Cow, P. B. Ord. ..	7/3	3/6	6/6*	6/9*
£1	„ 5% Pref. ..	14/3	10/9	14/-	14/3
5/-	Dale, John Ord... ..	24/6	10/-	23/3	22/6
£1	„ „ 6% Pref. ..	16/-	13/-	15/7½	15/7½
1/-	Dannimac Mfg. Ord. ..	8/9	2/6	7/9	8/3
10/-	De La Rue Ord. ..	62/6	42/9	55/6	61/3
£1	„ „ „ 3½% Pref. ..	12/-	10/-	11/9	12/-
6/8	Distillers Co. Ord. ..	32/6	15/9	31/3	32/6
£1	„ „ 6% Pref...	21/7½	19/10½	21/-	21/3
£100	„ 5% Conv. Loan	£96½	£91	£93	£94½
£100	„ 5½% Unsec. Loan	£95	£87 7/16	£92	£93
10/-	Dunlop Rubber Ord. ..	29/-	14/9	28/-	29/-*
£1	„ 5½% Pref.	19/-	15/10	18/9	19/-
£100	„ 3½%1st Debs.	£77½	£67¾	£77½	£77½
£100	„ 4½% 2nd Debs.	£84	£78	£82½	£82½
4/-	Ebonite Cont. Ord. ..	15/3	7/6	11/6	11/6
£1	English China Clays Ord.	75/-	29/9	71/-	75/-
£1	Goodyear Tyre 4% Pref.	12/9	12/-	12/9	12/6

Par Value	Company	1958-59 High	Low	Oct. 31	Latest
5/-	Greeff Chem. Ord. ..	30/7½	14/-	28/9	30/7½
10/-	„ „ 5½% Pref...	8/3¾	7/9	8/-	8/-
4/-	Greengate & Irwell Ord.	7/0¾	4/1½	4/3	5/-
£1	Harrisons & Crosfield Dd.	76/3	43/9	70/-	76/3
1/-	Hunt & Moscrop Ord. ..	2/1½	1/1½	2/1½	2/1½
£1	Imp. Chem. Ord. ..	56/-	28/3	54/3	54/6
£1	„ „ 5% Pref. ..	18/6	16/-	17/-	18/6
£100	„ 4½% Unsec. Loan	£88½	£80	£86½	£88
£100	„ 5½% Conv. Loan	£173	£99	£173	£173
1/-	Kleemann (O. & M.) Ord.	7/6	2/6	7/-	7/6
£1	„ „ 6½% Pref.	17/3	15/-	17/-	17/3
2/-	Lacrinoid Prod. Ord. ..	2/5½	1/5½	2/3	2/3
5/-	Laporte Ind. Ord. ..	27/6	13/7½	26/-	26/-*
£1	„ „ 7½% Pref.	23/9	21/10½	23/3	23/9
£1	Leyland & Birm. Rubber Ord.	58/9	39/9	52/6	52/6
£1	„ „ 6% Pref.	21/3	16/1½	16/10½	16/10½
2/-	London Rubber ..	12/-	6/3	11/6	12/-
£1	„ 6% Red. Cum. Pref.	19/9	16/3	18/9	18/9
£1	McKechnie Bros. Ord.	61/3	23/6	47/6	61/3
£1	„ „ 'A' Ord.	60/-	30/-	46/3	60/-
£1	„ „ 6% Cum. Pref.	17/-	16/-	17/-	17/-
5/-	Monsanto Chem. Ord. ..	21/-	13/-	21/-	21/-
£1	„ „ 3½% Pref.	13/-	11/-	13/-	13/-
£100	„ 6% Debs.	£104	£101½	£103	£103
£1	North British Rubber ..	—	—	16/6	16/9
5/-	Redfern Holdings Ord...	5/2½	2/10½	5/-	5/-
2/-	RFD Ltd. Ord.	6/6	3/5½	6/-	6/-
£1	„ „ 5½% Pref. ..	15/-	11/6	14/10½	14/9
2/-	Rubber Imp. Ord. ..	15/6	4/9	6/-	6/-
2/-	„ „ 'A' Ord.	14/3	4/6	5/-	5/-
£1	„ 5% 1st Pref.	12/3	10/-	10/-	10/-
5/-	Rubber Reg. Ord. ..	13/6	10/6	13/6	13/6
4/-	Shaw Francis Ord. ..	20/3	9/9	18/9	20/3
2/-	Silentbloc Ord. ..	9/9	7/6	9/9	9/6
2/-	Sussex Rubber Ord. ..	1/11½	7½	1/7½	1/7½
5/-	Sutcliffe Speak Ord. ..	10/-	5/-	9/6	10/-
£1	Turner & Newall Ord. ..	93/-	52/-	92/6	91/-
£1	„ „ 7% Pref.	25/-	22/1½	23/9	24/3
5/-	Universal Asbestos Ord.	27/6	8/0¾	26/3	27/6
5/-	Viscose Dev. Ord. ..	13/9	6/3	11/3	11/6
5/-	Warne William (Holdgs.) Ord.)	14/9	8/-	14/3	14/7½

*Ex-dividend †Ex-all ‡Ex-bonus §Ex-rights

Rubber Markets

LONDON

The squeeze on nearby positions has continued in the rubber market during the past week and sharp gains have been recorded. The Spot price is up 2¼d. at 37d. nominal per lb. while nearby positions are over 2d. per lb. higher. The more distant positions have also advanced sharply and gains here exceed 1d. per lb. The advance reflected the activity and strength of the Singapore market. It is now clear that the current shortage of rubber will not be materially relieved by sales from either the US or Board of Trade stockpiles.

Latest prices are as follows:

No. 1 RSS Spot: 37d. nominal.

Settlement House:

December 34¼d. nominal.

January/March 33d.-33½d.

April/June 31d.-31½d.

July/September 30d.-30½d.

October/December 29½d.-30d.

No. 1 RSS cif basis ports:

November 35¾d.-36¼d.

December 33¾d.-34¼d.

Godown:

November 124½ Straits cents nominal.

Latex

Centrifuged latex per gallon in drums, December shipment 22s. 9d., January, 22s. 3d., February, 22s., cif European ports. Spot, unobtainable, nominal 23s. 6d. Bulk, not quoted. Creamed, seller, 21s. 10d. December. Normal, seller, not quoted.

AMSTERDAM

The Amsterdam rubber market ruled as follows on November 2:

	Guilders per kilo	
No. 1 RMA	Nov. 2	Previous
November	3.30½	3.25
December	3.20½	3.15
January	3.15½	3.10
February	3.15½	3.10
March	3.10½	3.06
January/March ..	3.15½	3.10

Sales: 15 Tendency: Steady

SINGAPORE

The market opened around previous levels on November 2 and ruled quietly steady at a slight advance. Trading was thin. Lower sheet and factory interest were on the small side. Offgrades were traded at somewhat wider differentials. In the afternoon the market was steady. Sellers were reserved and prices advanced sharply throughout on short-covering. As prices advanced sellers withdrew and buying became more urgent. The premium on November widened to 8¼ cents over December. During unofficial hours, prices went to the highest level of the day and the market finished on a firm note.

	Malayan cents per lb. fob Malayan ports to open ports	
	Close	Previous Close
No. 1 RSS, Nov. ..	123 –123½	118½–118¾
Dec. ..	114½–115	110½–110¾
No. 2 RSS, Nov. ..	120½–121¾	116½–117
No. 3 RSS, Nov. ..	118½–119½	114½–115½
No. 4 RSS, Nov. ..	116 –117½	111½–113½
No. 5 RSS, Nov. ..	113½–115	109½–110½
No. 1 RSS, Spot ..	127 –129	122 –124
No. 3 blanket, thick remilled, Nov. ..	112 –114	109 –111
No. 1 fine pale crepe, Nov. ..	129½–131½	126½–128½
2X thin brown crepe, Nov. ..	113½–114½	110 –111

Tendency: Quiet; quiet, steady; steady after firm; firm; quiet

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 224.00d. per gallon.

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on November 2, was 36.25 (36.25) US cents per lb.

NEW YORK

The New York rubber market ruled as under on November 2:

Futures—Rex Contract

US cents per lb.

	Close	Previous Close
Nov. ..	44.75b—45.25a	43.50b—44.00a
Jan. ..	39.45t	38.65—38.75t
Mar. ..	37.10b—37.15a	36.55b—36.75a
May ..	36.35t	35.60b—35.80a
July ..	35.60b—35.70a	35.15b—35.20a
Sept. ..	35.30b—35.50a	34.90b—35.05a
Nov. ..	35.00b—35.20a	34.60b—34.80a

Sales: 25 Tendency: Steady

Dealers' Prices

Ex-dock, US cents per lb.

	Today	Previous
No. 1 RSS, Nov. ..	44½n	43¾n
Dec. ..	41 n	40½n
No. 2 RSS, Nov. ..	44½n	43½n
Dec. ..	40¾n	40 n
No. 3 RSS, Nov. ..	44 n	43½n
Dec. ..	40½n	39¾n
No. 1 RSS, Spot ..	46 n	45¾n
No. 3 amber blanket crepe, Jan. ..	38 n	37¾n
No. 1 latex thin crepe, Nov.	42 n	41¾n
No. 1 latex, thick crepe, Nov.	42½n	42 n

Rubber futures were firm on November 2, following foreign markets. The January position went up about a cent before some profit-taking pared the gain. Dealings were quiet, however. Later in the day, futures held steady and were about half a cent higher for the day. Physical rubber was inactive. Traders said that factories were backing away from the firm asking prices. In the closing stages, nearbys advanced more than half a cent for the day in light covering in a thin market.

DJAKARTA

The Djakarta rubber market ruled as follows on November 2:

	Rupiahs per kilo	
	Nov. 2	Prev.
Spot No. 1 Priok ..	40.65b	40.50b
Spot No. 2 Priok ..	39.65b	39.50b
Spot No. 3 Priok ..	38.65b	38.50b
No. 1 fine pale crepe, spot	40.00b	39.50b

Tendency: Firm

CEYLON

No. 1 RSS

The price for No. 1 RSS Spot, at Colombo on November 2 was 154¼ (146¾) Ceylon cents per lb.

STOCK MARKET

Continued from page 574

ordinary spurted from 47s. 6d. to 61s. 3d. while the 'A' rose from around 46s. 3d. to 60s. This move followed the preliminary profits statement which disclosed a sharp recovery in the fortunes of this concern. The group profit rose from £527,000 to £943,000 and the net figure jumped from £246,000 to £617,000. The dividend on both classes of stock was held at 15% less tax but a special dividend of 5% tax free from capital profit was also added to the payment.

The above profit included a capital gain from appreciation in metal values of £135,000 which compares with a loss of approximately £125,000 in the previous year. It would not be surprising to see these shares pushed higher still, the yield on them is certainly attractive and the directors have a reputation for shrewd management in the City.

P. B. Cow ordinary are still being held in check because of the disappointment with the recently announced profits. It is now being pointed out in the City that these profits did not take in what must have been a most active trading period for the company.

The ordinary of Rubber Improvement appear to have settled down at around 6s., and because the last results of Leyland and Birmingham Rubber did not meet the demands of the optimists there is little astir here either.

U.S. Rubber Co. Earnings

The United States Rubber Co. has reported third quarter earnings of 1.09 dollars per share against 74 cents a year ago. For the first nine months of 1959 sales of 743,230,320 dollars produced a net income equal to 3.94 dollars per share against a volume of 607,104,417 dollars and a net income of 1.80 dollars per share in the comparable period of 1958. The company said results for 1959 include the operations of Englebert SA, of Belgium.

Industry INTELLIGENCE

Technical Data

Polysar Latex 721 in Rubberized Asphalt

A laboratory investigation on rubberized asphalt prepared by incorporating Polysar Latex 721, an SBR latex, in the asphalt forms the subject of Polysar Technical Report No. 8:8A, distributed in the UK by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4.

Polysar Latex 721 was added slowly to the hot asphalt (200°F.) and after evaporation of most of the water the temperature was increased to 285°F. to remove the last traces of water. The rubberized asphalt was then drawn off into suitable containers and allowed to stand overnight at 77°F. before evaluation. Data are given for penetration, softening point, cold flow, toughness and tenacity of the asphalt alone and for rubberized asphalt mixes prepared by adding Polysar Latex 721 to the asphalt and containing two, four and six parts of SBR per 100 parts of asphalt. With increasing SBR content, penetration and flow decrease, softening point increases, and toughness and tenacity show a large increase. Thus asphalt with only a small amount of SBR added is harder and less susceptible to temperature change while it shows a toughness and tenacity many times greater than asphalt alone. Polysar Latex 721 offers excellent latex stability and high solids content to minimize evaporation time. The report includes a discussion of prior work on the use of natural rubber in asphalt for road surfacing.

Suprasec D

In the production of polyurethane rigid foam *in situ*, a number of isocyanates have proved unsuitable on account of the toxicity hazard arising from the presence of isocyanate vapour. To overcome this hazard, a foam system based on a di-isocyanate diphenylmethane - composition, *i.e.*, Suprasec D, has been developed as a result of much research work. Substantial quantities of rigid foam have been produced *in situ* with Suprasec D for the insulation of cold stores, portable refrigerated containers and the holds and domestic chambers of ships. No ill effects on the operators of the foam-dispensing equipment have been observed.

This development is described in Technical Information — Urethane PC/U.11, issued by the Polymer and Chemicals Service Department of the Dyestuffs Division of I.C.I. Portable apparatus and techniques for the determination of low concentrations of polyisocyanate vapour, described in detail in the pamphlet, were used to measure the concentration of the vapour in the atmosphere of a cold store which was in the course of being insulated with several tons of polyurethane rigid foam by foaming *in situ*. The liquid reagents were poured into the cavities and, as they reacted, samples of the atmosphere were taken from the top of the cavity and close to the operator's face. No isocyanate vapour was detected. The presence of polyisocyanate vapour was only detected when samples of air were taken from a point a few inches above the surface of the foam as it was formed and rose in the cavity. Even under these conditions, the concentration of vapour did not exceed the acceptable level of 0.1 part per million (expressed as di-isocyanato-diphenylamine).

Machines, Materials and Equipment

Device 'Measures' Colour

An electronic device, capable of detecting colour differences as low as 0.2% in textiles, paints, plastics, paper and other materials, has been developed in the US by a subsidiary of Royal McBee, the typewriter company. Known as 'Color-Eye' this is a dual-purpose precision instrument for establishing and maintaining colour control. It 'measures' colours electronically and reduces them to easily-interpreted numerical values. It is simple to operate and saves considerable time on the production line by bringing colouring materials within acceptable quality control tolerances. It is being used in laboratory tests on various materials to help to solve such problems as fading, weathering, tinting strength and yellowing.

Bagged Carbon Black Handling

The many companies of the rubber, paint, plastic, and synthetic fibre industries who use quantities of furnace carbon blacks are beset by the problem of time and cost in the loading and handling of supplies packaged in standard 50lb. multiwall paper sacks. To overcome this problem and to give improved cleanliness Philblack Ltd., 1 Henbury Road, Westbury-on-Trym, Bristol, have developed a form of 'unitized' loading which may be handled by any standard fork lift truck. This service is now available to all consumers of British Philblacks at no extra charge. When normal pallet loads of bagged material are used they cause endless administrative problems, through the constant checking of empty pallet returning to the supplier, the checking and arbitration if pallets are damaged; plus a host of other problems—all wasteful in working productivity and costing money. In the system each filled multiwall paper sack is automatically glued on one side while moving along the conveying line. At the loading point the already glued bags are stacked on the unit pad in layers, so that each layer adheres to the lower bag layer and thus to the unit pad. This 'unitized' pad is then placed on special transit pallets on the delivery vehicle. By design of the layer pattern and the type of special glue used, complete handling safety and rigidity is given. The glue is weak enough to fracture without tearing the outer ply of the paper sack when the unit is broken down into individual bags at the point of usage; but is strong enough to shear to prevent any movement of individual bags during transit, unit handling, and in use storage.

Publications Received

Technical Notes 202

Technical Notes 202, the monthly organ of CIBA (ARL) Ltd., Duxford, Cambridge, is wholly devoted to a description of increasingly popular hyperbolic paraboloid roofs and their construction using the company's 'Aerolite' and 'Aerodux' adhesives. A full and illustrated account is given of the technical problems (stresses, etc.) involved in the erection and design of roofs of this type and some interesting photographs show some modern examples.

Marlex

A booklet entitled 'Marlex, Its Growth, Your Opportunities,' has been issued by the Phillips Chemical Company, Bartlesville, Oklahoma. The publication describes the properties of Marlex rigid polythene and lists some of the many end uses to which it is put. Many colourful illustrations are incorporated and some useful tabular material is included.